EFFECTIVENESS OF INTRADIALYTIC STRETCHING EXERCISE ON MUSCLE CRAMPS AMONG PATIENTS UNDERGOING HAEMODIALYSIS AT SELECTED HOSPITALS, SALEM.

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CERTIFICATE

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-John Fitzgerald Kennedy

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Abbreviations used in this study:

ESRD - End Stage Renal Disease

RLS - Restless Leg Syndrome

CKD - Chronic Kidney Disease

GFR - Glomerular Filtration Rate

ABSTRACT

An experimental study was done to evaluate the effectiveness of Intradialytic stretching exercise on muscle cramps among patients undergoing haemodialysis at selected hospitals, Salem. Quasi experimental pre test post test with control group design was used for this study. sixty patients were selected through Non Probability Purposive Sampling Technique. Among them 30 patients from Salem Gopi hospital were selected for experimental group and 30 patients from VIMS Hospital, seeragapadi were selected for control group. Pre test score of Muscle cramps were assessed by using Modified Penn Spasm Frequency scale in experimental and control group. The investigator performed Intradialytic stretching exercises for experimental group during dialysis. No intervention was given to control group. Post test was done on the third sittings by using the same scale.

The findings revealed that in pre test 8(26.66%) patients in experimental group and 11(36.67%) patients in control group had severe muscle cramps whereas in post test 24(80%) patients in experimental group had no muscle cramps and 14(46.67%) patients in control group had moderate muscle cramps. In experimental group the pre test and post test mean score was 6.5 ± 2.2 and 0.8 ± 2 respectively. The calculated 't' value 13.25 which was greater than the table value. Hence the hypothesis H_1 was retained at $p \leq 0.05$ level. Post test mean score for experimental and control group was 0.8 ± 2 and 7.4 ± 2.1 respectively. The calculated 't'value 16.5 which was greater than the table value. Hence the hypothesis H_2 was retained at $p \leq 0.05$ level. Thus it becomes evident that Intradialytic stretching exercise was effective in reducing the severity of muscle cramps among patients undergoing haemodialysis. The chi square value shows that there was no association found between muscle cramps and their selected demographic variables. Hence the hypothesis H_3 was rejected. The study concluded that Intradialytic stretching exercise was effective in reducing the severity of muscle cramps among patients undergoing haemodialysis.

CHAPTER I

INTRODUTION

"To enjoy the glow of good Health, You must Exercise"

Gene Tunney

Bones can break, muscles can atrophy, glands can loaf and even the brain can go to sleep without immediate danger to survival. But should the kidneys fail…Neither bone, muscle, gland, nor brain could carry on". **(Lewis, 2011)**

Kidneys are bean shaped organs located on both sides of the spine behind the stomach. Each one of the kidney size is about the adult fist. Their main purpose is to keep the composition of blood in the body balanced to maintain good health. The functions of the kidney are filtering extra toxins from the blood. The kidneys filter about 120 to 152 quarts (113 to 114 liters) of blood to create 1 to 2 quarts (0.94 to 1.81) of urine every day**. (Alina Bradford, 2016)**

Renal failure is characterized by progressive destruction of renal mass with irreversible sclerosis and loss of nephrons over period of at least few months to years, depending on the underlying etiology. Renal failure is classified into two. They are acute and chronic renal failure. Acute Renal failure is a rapid decrease in Kidney function leading to collection of metabolic wastes in the body. When the Glomerular Filtration Rate decreases Blood Urea Nitrogen level increases waste products build up in the blood causing uremia and azotemia. This acute syndrome may be reversible with prompt intervention. Acute renal failure may lead to chronic renal failure **(Divya Acha Jacob, 2016)**

A chronic kidney disease [CKD] involves progressive, irreversible loss of the kidney function. It is defined as either the presence of kidney damage or glomerular filtration rate [GFR] less than 60ml/minute for 3 months or longer. As per the data from the United States renal system disease like diabetic neuropathy, hypertensive

disease, glomerulonephritis and cystic disease are the primary renal disease leading to End Stage Renal Disease (ESRD). It is chronic and life threatening illness in which kidneys are permanently damaged and the person can no longer survive independently without renal replacement therapy. **(Moran, 2008)**

Haemodialysis was first introduced in 1960s to extend the lives of patient with end stage renal disease and by 1982, almost 1,00,000 patients throughout the world were being alive by some form of dialysis therapy. Dialysis removes many of the toxins responsible for the uremic syndrome and prolongs survival. Haemodialysis is a treatment that removes wastes and extra fluid from the blood. During Haemodialysis blood is pumped through soft tubes to a dialysis machine where it goes through a special filter called a dialyzer and also called an artificial kidney, a blood is filtered, it is returned to bloodstream. In order to be connected to the dialysis machine need to have an access or entrance to bloodstream. Treatments are usually done three times a week. Each treatment lasts about four hours. **(National Kidney Foundation, 2014)**

Approximately 20% of dialysis sessions are accompanied by muscle cramps. Muscle cramps are pronounced in patients who require high ultra filtration rate and are possibly dialyzed below their dry weight. They are presumably related to reduction in muscle perfusion that occurs in response to hypovolemia. Compensatory vasoconstrictive responses may shunt blood centrally during treatment and could play a role in promoting muscle cramps. Changes in intra or extracellular balance of potassium and concentration of ionized calcium can disturb neuromuscular transmission and produce cramps. Peripheral vascular disease associated with increased prevalence of intradialytic cramps which confirms that processes related to the dialytic treatment are responsible for the cramps**. (Brass EP., & Alders 2002)**

The common complications of haemodialysis are hypotension, muscle cramps, loss of blood, hepatitis, sepsis and disequilibrium syndrome. Muscle cramps occur in 33% to 38% of patients undergoing haemodialysis. These are painful, sustained contractions of skeletal muscles mainly of the lower extremities, such muscle cramps are presumably related to reduction in muscle perfusion that occurs in response to hypovolemia, poor blood flow, compensatory vasoconstriction response that shunts blood centrally during dialysis and carnitine deficiency. During haemodialysis the individual lies with the leg in a relaxed position for four hours which also contribute to muscle cramps. **(Holley, 2008)**

During Haemodialysis patients experience painful involuntary muscle contraction called cramps and found typically in the lower extremities are common but muscles of the hand, arm and abdomen may be affected with severe cramping often results in early termination of dialysis. This cramp is characterized by uncomfortable sensation usually in the extremities. **(Amal Ahmed, 2007)**

During Haemodialysis the individual lies with the leg in a relaxed position for four hours which also contribute to muscle cramps. A cramp pain typically lasts up to 10 minutes. The severity of the pain varies. The muscle may remain tender for up to 24 hours after a long cramp. The skin prior to cramping might feel cold to touch. They usually happen in the last half of a dialysis session. **(Basemath S.S. Morris, 2014)**

Exercise can make muscles stronger and joints are flexible. It will be easier for patients to reach bend, stoop and to do other dialysis activities. During dialysis, exercise increases the blood flow to the muscles and opens the capillary surface which subsequently increases the flux of urea from the tissue to the vascular compartment. It results in serum urea clearance and improvement in the dialysis efficacy. **(Latha, 2014)**

The health benefits of stretching are amazing as it can increase stamina, relax body and mind, improve focus and concentration, and reduce the risk of injury. Other benefits of stretching exercises are reduction of stress and tension, muscle pain, soreness and increase flexibility. It makes muscle tone elastic and reduces the risk of injury. Stretching exercise can lower the build- up of lactic acid in the muscles and help to eliminate tightness and chance of damage. **(Vishnupriya, 2012)**

There are many complementary therapies to reduce muscle cramps and it is becoming a significant part of modern day health care with millions of treatments taking place every year. The most used non pharmacological therapies are Stretching exercise, strengthening exercise and oil massage. Passive Stretching is effective to relieve muscle cramps during Haemodialysis session. **(Magda Mohamed, 2007)**

Stretching Exercise may be the best measure to reduce or prevent cramps. Passive stretching of the shortened muscle is the most effective treatment. Alternatively squeezing and releasing the cramped muscle may help. This mechanical kneading restores blood flow and generally helps relax the spasm and tightness.

Need for the study

End stage renal disease is an important non communicable disease in epidemic that affects the World Population including India. 1.5 population people suffered from end stage renal disease each year in India. **(Rajan Ravichandran, 2006)**

Chronic Kidney Disease is known to be a universal health problem because of its increasing prevalence and incidence all over the world. ESRD has been increasing rapidly in the last three decades among the Saudi population with the highest prevalence in the western region. Also the numbers are expected to increase as in the 2014, 136 per million populations were recorded of having end stage renal disease. Similarly, in the United States, Kidney disease is affecting more than 20 million

Americans and the incidence rates are expected to increase by 2% yearly. Moreover, the prevalence is expected to increase to 14.4 % in 2020 and up to 16.7% in 2030 from 13.2 % that was obtained in 2014. **(Mervat Adham Ghaleb, 2017)**

In End stage renal disease approximately 90% of renal function has been lost, rendering the body incapable of maintaining proper fluid and electrolyte balance, adequate waste removal and normal hormonal function. Patients on Haemodialysis account for approximately 92% of the overall dialysis population endure high symptoms such as fatigue, decreased appetite, trouble concentration, swelling in the feet and hands, muscle cramps and all of which causes dialysis distress**. (Latha, 2014)**

Approximately 1 in 3 American adults are currently at risk for developing kidney disease, 26 million American adults having kidney disease. Kidney disease is the 9th leading cause of death in United States. In 2013, more than 6,61,000 Americans have kidney failure, of these 4,68,000 individuals are on dialysis and approximately 1,93,000 live with a functioning kidney transplant of more than 1,20,000 people waiting for lifesaving organ transplant in the United States. 1,00,102 await kidney transplant (as of April 2016). Every day 13 people die waiting for a kidney. **(National Kidney Foundation, 2016)**

Muscle cramps arise in 33% to 86% of patients on haemodialysis, Fatigue 82%, intradialytic hypotension 76 %, and dizziness 63% were the most common dialysis related symptoms, with fatigue occurring in 50% of Dialysis Session and cramps occurring 30 % of Dialysis Session. **(Caplin Kumar, 2011)**

Approximately 20% -62% of people undergoing dialysis reported muscle cramps, symptom disappear after a kidney transplantation also one third of the patient over 60 years and half of the patient over 80 years suffer from cramp at rest. Forty percent of people with muscle cramp have more than three episodes per week and 6%

have episodes at least once every 24 hours. **(Shalabia Abo Zead, 2007)**

The most common complications during Haemodialysis are in descending order of frequency, hypotension (20% -30 %) , cramps (5 %-20 %), Nausea and vomiting (5% -15%), headache (5%), Chest pain (2 %- 5%), back pain (2%- 5%), itching (5%), and fever and chills (less than 1%). **(Sherman et al., 2007)**

The treatment of the cramps is early termination of haemodialysis. Most of the muscle cramps about 90% are considered by the patients during haemodialysis. Majority of patients complain if muscle cramps at one or other time during dialysis usually of lower extremities that too of calf Muscles. **(British Medical journal, 2010)**

Muscle Cramps are common complication during dialysis treatments. Cramp occurs in 1/3 or 2/3 of all dialysis patients. Patients tend to experience in the lower extremities, but they occur in the hands, arms and abdominal muscle as well. Causes like low blood sodium concentration, low body magnesium and Carnitine deficiency as well as rapid removal of large volumes can result in cramps **(Paul Kellerma.MD, 2014)**

East California University School of medicine at United States of America stated that the Incidence of leg cramps is very common among older patients when they undergo haemodialysis. In that 85% of patient symptoms were relieved effectively by practicing the stretching exercise during dialysis. **(Rideley et al., 2012)**

A study was conducted to assess the physical therapy during haemodialysis in patients with chronic kidney disease. The therapy consists of muscle strengthening exercises, stretching and stationary exercises. Fifty six chronic kidney disease patients were participated. They underwent evaluation before the start of the program and after the training. The results showed an improvement of quality of life and physical ability of patients with chronic kidney disease. **(Silva .SF et al., 2013)**

An experimental study was conducted to assess the beneficial effects of exercise during haemodialysis and also to introduce various intradialytic stretching programs and their advantages. The study concluded that aerobic and resistance exercise are beneficial not only in improving physical functioning, including maximal oxygen uptake and muscle strength but also in improving anthropometrics, nutritional status, hematological indexes, inflammatory cytokines, depression and health related quality of life. **(Tae-Du Jung and Sun-Hee Park, 2011)**

Muscle cramp is the major complication during haemodialysis. Non-drug management is the first line treatment for people with muscle cramps. Passive stretching and massage of the affected muscles can relieve an acute cramp attack. Passive stretching should be performed with active contraction of the opposing muscles. There are many non-pharmacological interventions to reduce the pain (muscle cramps) among those patients undergoing haemodialysis. Various studies showed that intradialytic stretching exercise can reduce the muscle cramps. Hence, the Researcher felt the importance of providing the intradialytic stretching exercise to reduce muscle cramps among the patients undergoing haemodialysis.

Statement of the problem:

A Study to Assess the Effectiveness of Intradialytic Stretching Exercise on Muscle Cramps among Patients undergoing Haemodialysis at Selected Hospitals, Salem.

Objectives:

1. To assess the level of muscle cramps among patients undergoing Haemodialysis in experimental and control group.
2. To evaluate the effectiveness of Intradialytic stretching exercise on muscle cramps among patients undergoing haemodialysis in experimental and control group.

3. To associate the level of muscle cramps among patients undergoing haemodialysis with their selected demographic variables in experimental and control group.

Operational definitions:

Effectiveness:

It is the significant reduction in muscle cramps after performing intradilaytic stretching exercises as measured by modified Penn spasm frequency scale among patients in experimental group.

Intradialytic stretching Exercise:

Intradialytic stretching exercise is a form of active and passive exercise that prevents stiffness, relieves tendon sortening and relaxes muscles to prevent cramps during the dialysis procedure. Exercise will be given at third hour of dialysis for about 20 minutes.

Muscle cramps:

Painful involuntary spasm experienced by the patients in Gastronomies muscles and Calf muscle of the lower extremities.

Haemodialysis:

Blood is removed from the body and filtered through a man-made membrane called dialyzer or artificial kidney and the filtered blood is returned again to the body. It is a therapy that filters waste, removes extra fluid and balances electrolytes.

Patients:

It refers to the people who are diagnosed with chronic renal failure and are undergoing haemodialysis in the unit.

Assumptions:

1. The patient undergoing haemodialysis may experience muscle cramps in the lower extremities.
2. Intradialytic stretching exercise may reduce the Muscle cramps.

Hypotheses:

H_1: There is a significant difference in pre test and post test scores on muscle cramps among patients undergoing haemodialysis in experimental group at $P \leq 0.05$ level.

H_2: There is a significant difference in post test scores on muscle cramps among patients undergoing haemodialysis in experimental and control group at $P \leq 0.05$ level.

H_3: There is a significant association between the pre test score on muscle cramps among patients undergoing haemodialysis in experimental and control group with their selected demographic variables at $P \leq 0.05$ level.

Delimitations:

1. The study was limited only to the patients undergoing haemodialysis who were experiencing muscle cramps at Salem Gopi Hospital and VIMS Hospital.
2. The data collection period was limited to four weeks.
3. The study was limited to those who are willing to participate in the study.

Projected Outcome:

1. Intradialytic stretching exercise would reduce the level of muscle cramps among patients undergoing haemodialysis.
2. The findings of the study would help the health care professionals to provide Intradialytic stretching exercise effectively.

Conceptual Framework:

Conceptual models are made up of concepts, which are describing mental images of phenomena or prepositions which are statements about concepts. This represents schematic representation of some relationship among phenomena.

Imogene king proposed a theory which offers insight to nurse's interactions with individuals and groups within the environment. It highlights the importance of client's perception in decision that influences care and focuses on both the process of nurse client interaction and the outcomes of care. The major concepts includes

Perception:

This involves each person's representation of reality. Researcher perceives and assess the severity of muscle cramps and need of Intradialytic stretching exercise to reduce muscle cramps among patients undergoing haemodialysis.

Judgement:

Judgement is the decision made by both researcher and patients. The researcher decided to assess the muscle cramps during dialysis by using modified penn spasm frequency scale and to perform Intradialytic stretching exercise to the patients undergoing haemodialysis with muscle cramps and the patients decided to participate in the study.

Action:

The researcher action is to perform Intradialytic stretching exercise to the patients undergoing haemodialysis with muscle cramps and patients decide to perform the exercise with the help of researcher.

Reaction:

Reaction helps in setting a mutual goal. Here the researcher and patient set a mutual goal. The mutual goal is reduction of muscle cramps.

Interaction:

This involves a process of perception and communication. The Researcher identifies the patients undergoing haemodialysis with muscle cramps and maintains good interaction with the patients and encouraged them to practice exercise.

Transaction:

It is the purposeful interaction leading to goal attainment. The researcher reassesses muscle cramps after the intervention by using modified penn spasm frequency scale.

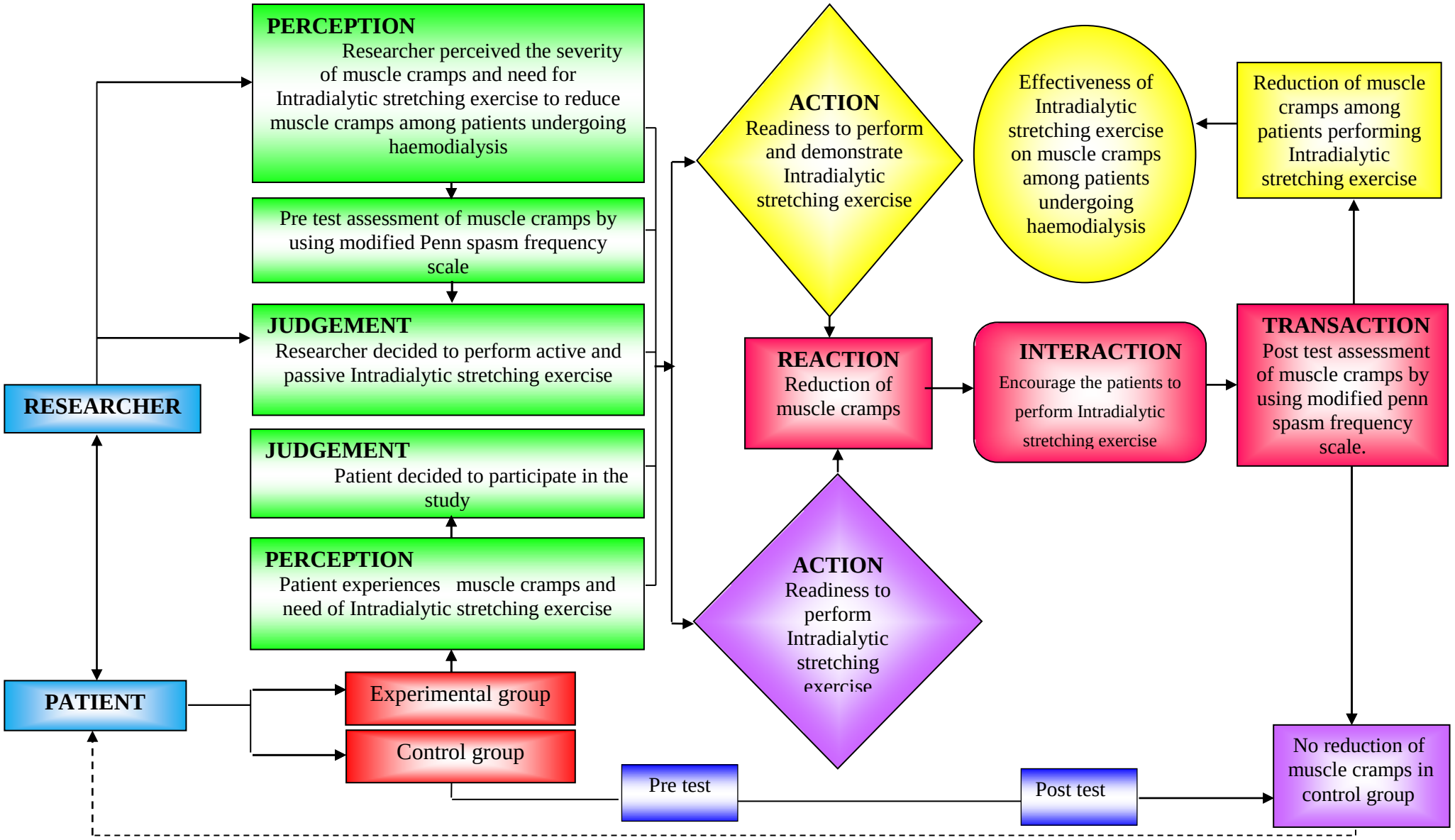

Figure-1.1: Conceptual Frame Work based on Imogene King's Goal Attainment Theory (1981) of Effectiveness of Intradialytic Stretching Exercise on Muscle Cramps among patients undergoing Haemodialysis.
(--------) Not included in the study

Summary:

This chapter dealt with introduction, need for the study, statement of the problem, objectives, operational definitions, assumptions, hypothesis, delimitations, projected outcomes and conceptual frame work.

CHAPTER-II

REVIEW OF LITERATURE

Review of literature is a critical summary on a research topic of interest, often prepared to put a research problem in a context. (**Denise F. Polit, 2006).**

Review of literature is a very important part of research study. The review of literature for the study is arranged in the following headings:

1. Literature related to muscle cramps during dialysis.
2. Literature related to effectiveness intradialytic stretching exercise on muscle cramps.

1. Literature related to muscle cramps during haemodialysis:

The case study was done to assess the muscle cramps episodes in haemodialysis patients. Totally twenty patients were participated in the study. Among them 12 were males and 8 were females. All were done the haemodialysis for 8 to 12 months, weekly thrice. Periodical assessments were done by assessing dry weight, weight gain and target removal analyzer the patients were monitored through the dialysis session for the period of around ten weeks. Totally 30 sessions of dialysis for each patient shows that all patients had the episode of muscle cramps in interdialysis session. Result shows the site and intensity of muscle cramps among haemodialysis patients, abdominal cramps seen in 12 patients, upper limb extremities seen in 11 patients, calf muscle seen in 9 patients and others (feet, neck and Palmar space) seen in 7 patients. The study concludes that by assuring the dry weight and monitoring the sodium frequently the episodes of muscle cramps can be controlled**. (Appanraj.R., Kumar,A., & Usha. 2015)**

A Retrospective study was conducted to assess the spectrum of intradialytic

complications during haemodialysis in Institute of Medical sciences at Uttarpradesh. Patients who underwent conventional haemodialysis during the period of 1st January 2000 to 31st December 2011. Totally 2325 patients of renal failure (750 ARF and 1535 CRF) were assessed for the Intradialytic complications of haemodialysis. During the Study period, there were 12,785 bicarbonate analyses performed on these patients. Study result revealed that in acute renal failure patients cramps seen in 85 sessions (2.0%) and in chronic renal failure cramps seen in 256 sessions (3.0%). **(Prabhakar et al., 2015)**

A Descriptive study was conducted to assess the pain in haemodialysis patients at southern European city hospital. Totally 70 patients were assessed by using the visual analog scale, the Wong-Baker Scales and McGill pain questionnaire. The result shows that forty percent patients pinpointed internal pain occurs in the legs and they described the Pain experience was sickening (70.8%), tiring (67.7%), burning (66.2%), rhythmic (86.2%), periodic (66.2%) and continuous (61.5%). **(Kafkia.T et al., 2014)**

A Prospective study was conducted to find out the frequency of various acute complications during the haemodialysis at Isra University Hospital, Hyderabad over a period of 27 months from November 2010 to January 2013.The patients of end stage renal failure and advance acute renal failure were observed for complications during haemodialysis. In total 176 patients, males were 166(66%) and females were 60 (34%).Totally 2171 haemodialysis sessions were performed. In that muscle cramps was observed in 67 (3.08%) during daily sessions of haemodialysis. **(Rashid Ahmed Shaikh et al., 2013)**

A Descriptive study was done to evaluate the acute intradialytic complications and outcome in ESRD patients at dialysis center of mymensingh. 500 consecutive

haemodialsyis sessions incurred over a 4 month period by 50 patients with ESRD, receiving two weekly haemodialysis sessions of 4 hours each were considered. Personal and clinical profiles before, during, and within 24 hours after haemodialysis sessions were used to diagnose complications. The study revealed that 48% of patients have occurrence of muscle cramps during haemodialysis. **(MJ Hasan et al., 2013)**

A cross sectional study was conducted to assess the Acute Intradialytic complications in ESRD on maintenance haemodialysis in National Academy of Medical sciences at Nepal Bir Hospital from 15th June 2007 to 15th December 2007.Totally 28 patients were participated in the study. Total sessions of haemodialysis during the period were 1455.The result revealed that muscle cramps occurs about 12 episodes (0.8%) during each sessions of haemodialysis.. **(Agarwal. RK et al., 2012)**

2. Literature related to effectiveness of Intradialytic stretching exercise on muscle cramps:

An experimental study was conducted to assess the effect of Intradialytic Leg exercise on Dialysis during efficacy among patients undergoing Haemodialysis at King Fahad Hospital of the University, Saudi Arabia. Thirty adult patients who fulfilled the inclusion criteria were selected randomly from Haemodialysis unit. They were divided equally into experimental group and control groups. Assessment tool consists of four sections. They are section I addressed the socio-demographic data, section II addressed the medical history, Section III addressed related to blood test results and Section IV included the vital signs. For experimental group six weeks exercise program was conducted. Each session lasted for 25 minutes during dialysis. It was done three times a week. On the other hand, the control groups received the

routine dialysis care. For both groups, data recollected using the same tool after three weeks, then after 6 weeks. The result revealed that statistical significance difference was found between the two groups before exercise and after 3 weeks (p=0.007 & p=0.02) respectively. The study concluded that leg exercise during Haemodialysis shows statistical significant improvement**. (Seham AL.Rashedi et al., 2017)**

An experimental study was conducted to assess the effect of Intradialytic stretching exercise on muscle cramps among patients undergoing haemodialysis at Rangadore Memorial Hospital in Bangalore. Modified Numerical Pain intensity scale were used to assess the muscle cramps and personal data was assessed by demographic and clinical questionnaires. The stretching exercise was given during the haemodilaysis and post test was done by using the same scale. The study reveals that 3.19 ($p<0.01$) and 5.8 ($p<0.001$) there is a significant difference found between experimental and control group respectively. The study concluded that intradialytic stretching exercise was effective in terms of reduction of muscle cramps during haemodialysis. **(Manjunadhan , 2017)**

A Single blind Experimental study was done to assess the effect of Intradialytic stretching exercise on muscle cramps among patients undergoing Haemodialysis at South Indian Tertiary Hospital in University Brunei Darussalam. A Post test only design was used for this study. 64 samples were randomly assigned to the experimental and control group. Socio-demographic and clinical variables were collected. Passively intradialytic stretching exercise was given at the second hour of haemodialysis. Samples were observed for occurrence of muscle cramps and its characteristics on third and fourth hour of haemodialysis. The result shows that intensity of the muscle cramps of experimental group differed from the control group significantly during third hour ‘t’ 3.76 and fourth hour ‘t’ 3.11 at $p <0.001$ of

haemodialysis. The study concluded that prophylactic intradialytic stretching exercise is effective in reducing the muscle cramps among patient undergoing haemodialysis. **(Sujitha Elavally et al., 2017)**

A Quasi experimental study was done at East Coast Hospitals, Pondicherry. The aim of the study is to assess the effect of intradialytic stretching exercises on muscle cramps among patient undergoing haemodialysis. Forty samples the experienced muscle cramps were selected by non-probability convenient sampling technique. Subjects were evaluated for muscle cramps by Interview schedule and modified muscle cramps scale tool. The study found that assessment of pre-test 19(47.5%) having severe, 18(45%) moderate, 3(7.5) mild muscle cramps, whereas in post-test 3(7.5%) having severe, 11(27.5%) moderate, 17(42.5%) mild and 9(22.5%) does not have muscle cramps. The study concluded that intradialytic stretching exercise helps for reduction in the muscle cramps. **(Kishor,k.M.,Renuka.K., & Nalini.S et al., 2016)**

An Experimental study was conducted to assess the effectiveness of Intradialytic Stretching Exercise on reducing Muscle cramps among Haemodialysis patients at Sri Manakula Vinayagar Medical College and Hospital, Puduchery. A Pre Experimental Research design was selected for this study. Seventy Haemodialysis patients were selected by using purposive sampling technique. The level of muscle cramps was assessed by Modified Penn Spasm Frequency scale. Descriptive and Inferential statistics was used for analysis. In Pre test 27(38.5%) of them had moderate level of muscle cramps, 43(61.4%) of them had severe level of muscle cramps. In post test 5(7.1%) of the patients had no muscle cramps, 28(39.9%) of the patients had mild level of muscle cramps and 37(52.8%) of the patients had moderate level of muscle cramps. The overall average score is 11.57 with the standard deviation

of 3.52, after the administration of Intradialytic stretching Exercise the level of muscle cramps was reduced to 5.44 with the standard deviation of 2.96.The study implies that the Intradialytic stretching Exercise is an effective intervention to reduce muscle cramps during Haemodialysis among Haemodialysis patients**. (Danasu.R, 2016)**

An Experimental study was conducted to assess the effectiveness of Intradialytic massage on the frequency of cramping among haemodialysis patients prone to lower extremity cramping. The participants are 26 haemodialysis patients with frequent lower extremity cramps. The setting was three outpatient centers in Northeast Ohio. The randomized controlled trial was adopted for this study. The intervention group received a 20 minute massage of the lower extremities during each treatment for two weeks. The control group received usual care by dialysis center staff. The results shows cramping decreased by 1.3 episodes per week in the interventional group compared to 0.2 episodes per week in the control group (p=.005). Patient reported cramping during dialysis decreased by 0.8 episodes in the intervention group compared to 0.4 episodes in the control group p= (0.44).The study concluded that intradialytic massage appears to be effective way to address muscle cramping. **(Diane.M et al., 2016)**

A quasi experimental study was conducted to compare the effects of passive and active intradialytic stretching exercise on dialysis efficacy, electrolytes, haemoglobin, blood pressure and health related quality of life in haemodialysis patients at Akavan Haemodialysis Center in Kashan.16 haemodialysis samples were followed from April to November 2013. Active or passive intradialytic pending exercise was performed using a mini-bike for 30 minutes during the first two hours of dialysis cycle. Paired t-test and the wilcoxon signed rank and Friedman tests were used to compare the variables. The study concluded that both exercises are effective

(Musavian AS et al., 2015)

A Randomized control study was conducted to assess the effectiveness of Intradialytic Stretching Exercise on Fatigue and activities of Daily Living Among patients subjected to Haemodialysis. The research design selected for the study was two group pretest posttest design. A total of 40 samples were selected which was divided in to study group by using randomization technique. Pretest was conducted for both the groups and intradialytic leg exercise was instructed only to the study group along with routine care. Post test was done on 22nd day of Haemodialysis by using Multidimensional Assessment of Fatigue (MAF) scale. Data was analyzed by using descriptive and inferential statistics. During pretest 13(65%) of them had moderate level of fatigue and 7(35%) had severe fatigue and in the post test 7(35%) had mild fatigue about 10(50%) had moderate fatigue and 3(15%) had severe level of fatigue in the study group. The pre test mean score of the study group was 2.35 and the post test mean score was 1.80. The calculated 't' value was 4.819 which was statistically significant at $p<0.001$ level. The pre test mean was 2.25 and in the post test the mean score was 2.95. The calculated 't' value was -6.658 which was statistically significant at $p <0.001$. The study concluded that providing Intradialytic Stretching Exercise will improve the Effectiveness of dialysis decreasing the level of fatigue. **(Jose,s., Devi,B., & Victoria,E. 2014)**

An experimental Study was conducted regarding effectiveness of Intradialytic Stretching exercise on fatigue by using evaluative approach at Mangalore. The objectives of the study were to evaluate the effectiveness of Intradialytic stretching Exercise on level of Fatigue and quality of life among chronic renal failure patients undergoing Haemodialysis. To assess the Quality of Life and Fatigue WHO QOL BREF Scale was used. Subjects were instructed to fill the instruments and after that

Intradialytic Stretching exercises were taught to the patients and they were assisted to perform the exercises during each visit. The data collection period was three weeks and at the fourth week post test was conducted. Data was analyzed by using Descriptive and Inferential statistics. The statistical results were calculated t value 12.71 is greater than table value t_{39}=1.69 and p value is <0.05.The study concluded that Intradialyitc Stretching exercise was effective in reducing the fatigue among Haemodialysis.**(Latha.S ., & Mathew,A. 2014)**

A Clinical Trial study was conducted to assess the effect of Intradialytic Stretching exercise on severity of symptoms of Restless Leg Syndrome (RLS) and quality of sleep in Haemodialysis patients at haemodialysis ward of Hasheminejad hospital in Tehran. Participants were selected by RLS screening scale and doctor examination and were randamoized to either exercise or control groups. RLS severity and quality of sleep were assessed by the International Restless Legs syndrome Study Group Severity. Data were analyzed by SPSS Package by chi-square and t-test. At the end of 8^{th} week the exercise group (n=17) had a significant improvement in RLS symptoms and quality of sleep compared with the control group (n=16).The study conclude that stretching exercise are effective in reducing RLS symptoms and improving quality of sleep in haemodialysis patients. **(Zahra Abbasi, 2013)**

A randomized controlled trial study was conducted to assess the stretching before sleep reduces the frequency and severity of nocturnal leg cramps in older adults and 80 adults over 55 years with nocturnal leg cramps who were not being treated with quinine. Pretest posttest with comparison group design was used for the study. Participants recorded the frequency of nocturnal leg cramps, the severity of the pain associated with nocturnal leg cramps on a 10-cm visual analogue scale. At six weeks, the frequency of nocturnal leg cramps decreased significantly more in the

experimental group. The study concluded that stretching before going to sleep reduces the frequency and severity of nocturnal leg cramps in older adults. **(Hallegraeff et al., 2013)**

A descriptive study was done to determine the effect of prolonged intradialytic exercise in haemodialysis efficiency indices. The study consists of ten stable high-functioning haemodialysis patients. The patients performed supine exercise (cycling) for 3 hours at 40% of maximum exercise capacity and no exercise as usual. Blood sampling was acquired pre- and post- haemodialysis to calculate the HD efficiency indices. All patients completed the exercise regime with no side effects. The urea reduction ratio, and creatinine reduction ratio significantly improved by 20%, 11%, and 26%, respectively, while potassium plasma levels were reduced by 77.5% ($p < 0.05$). The results concluded that prolonged low-intensity intradialytic exercise improved Haemodialysis efficiency, with no adverse effects. **(Giannaki CD et al., 2013)**

A prospective, randomized single-blinded controlled trial study was done to assess the effect of calf stretching box on stretching calf muscle compliance 80 patients older than 45 years old with calf muscles tightness were enrolled. Patients were randomized into two groups, the experimental group and the control group. Patients in both groups were asked to hold the stretch for at least 1 minute and to perform the stretching program at least two times per day, every day for two weeks. They were asked to record the real frequency and duration of their exercise and complications in a logbook every day. The study concluded that the stretching calf muscle can increase compliance, decrease calf muscle tightness and decrease complications when compared with the conventional exercise method. **(Suwannakin et al., 2009)**

An Experimental Study was conducted to assess the protocols on reduction of leg cramps during Haemodialysis among Chronic Renal Failure Patients at Kidney Dialysis Unit of Assiut University Hospital. Totally 60 adult patients including both sexes were selected. A Structured interview was used to collect the data. The Findings reveals that a highly statistical significance between before and after performance leg exercise as regarded exercises, performance of exercises, important of exercises, present pain after exercises and frequency of pain a statistically significant difference were evident χ^2=32.87, χ^2=86.72, p=0.01, χ^2 =40.34, p=0.01, χ^2=4.39,p=0.03 and χ^2=3.97, p=0.04 respectively. The study concluded that there was lack of knowledge and skills related to muscle cramps before nursing intervention protocol and there was statistical significant difference after performance of exercises. **(Amal Ahmed, 2007)**

Summary:

This Chapter dealt with review of literature related to muscle cramps during haemodialysis and effectiveness of Intradialytic stretching exercise on muscle cramps.

CHAPTER III

METHODOLOGY

The methodology of research indicates general pattern of organizing the procedure for gathering valid and reliable data for the purpose of investigation. **(Polit D.F.Hungler, 2006)**

This study aims to assess the effectiveness of Intradialytic stretching exercise on muscle cramps among patients undergoing haemodialysis at selected hospital, Salem. This chapter includes research design, description of settings, variables, population, sample, sampling technique, sample size, criteria for sample selection, description of tool and data analysis method.

Research Approach:

Quantitative research approach was adopted for this study.

Research design:

The research design chosen for the study is quasi experimental pre test post test with control group design. This design can be represented as

E = O_1	X	O_2
C = O_1		O_2

E- Experimental group includes patients undergoing haemodialysis with muscle cramps in salem Gopi hospital and receiving Intradialytic stretching exercise.

X- Intradialytic stretching exercise.

C- Control group includes patients undergoing haemodialysis with muscle cramps in VIMS hospital and not receiving Intradialytic stretching exercise.

O1- Pre test assessment of muscle cramps by modified Penn spasm frequency scale.

O2- Post-test assessment of muscle cramps by modified Penn spasm frequency scale

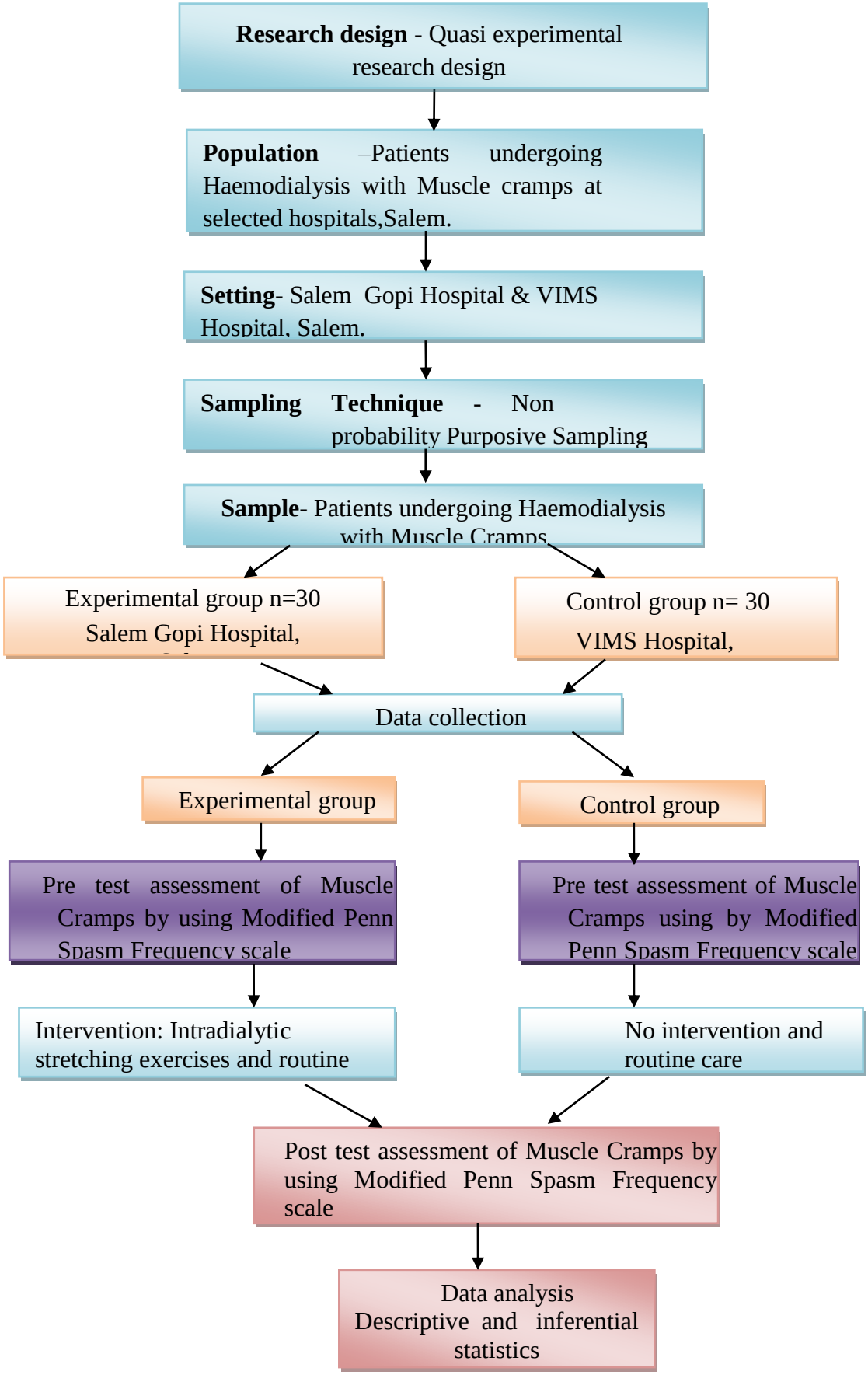

Fig -3.1: Schematic representation of Research Methodology

Population:

The population of this study includes patients undergoing haemodialysis with muscle cramps at selected hospitals, Salem. On an average per day patients undergoing haemodialysis in Salem Gopi Hospital was 40-50 and in VIMS Hospital 30 - 40.

Description of the settings:

The investigator selected Salem Gopi Hospital and VIMS Hospital to conduct the study. Both hospitals were run under private organization in Salem. The investigator selected Salem Gopi Hospital as experimental group. The bed strength of the hospital was 70. The hospital was well known for renal failure management like Dialysis, Renal Transplantation and various other procedures. It was 15 km away from the Sri Gokulam College of Nursing. The investigator selected VIMS Hospital for the control group. It was 150 bedded Multispecialty hospital situated in Seeragapadi near Ariyanoor which was 8 km from Sri Gokulam College of Nursing. The settings were selected by using convenient sampling technique. These areas were selected based on

1. Availability of subjects.

2. Economy of time and money access.

3.Feasibility in terms of cooperation extended by the nephrologists in Salem Gopi Hospital and VIMS Hospital ,the health team members and the investigator's familiarity with the setting in terms of professional experiences.

Sampling:

Sample:

Sample of the study includes patients undergoing haemodialysis with muscle cramps and those who fulfilled the inclusion criteria and present during the time of data collection at selected hospitals.

Sample size:

Sample size of the study includes 60 patients undergoing haemodialysis with muscle cramps. Among them 30 patients were selected for experimental group and 30 patients were selected for control group.

Sampling technique:

Non probability purposive sampling technique was adopted for selecting samples for the study.

Criteria for sample selection:

Inclusion criteria

The patients who

- were in the age group of 21 to 70 years.
- were both male and female.
- were diagnosed as chronic renal failure.
- were undergoing haemodialysis twice a week with muscle cramps.
- could understand Tamil or English.

Exclusion Criteria:

The patients who

- were having femoral catheter.
- were undergoing emergency haemodialysis.
- have intellectual or mental impairment.

- were having any lower limb pathology.
- were not willing to participate.

Variables:

Independent variable: Intradialytic stretching exercise

Dependent variable: Muscle cramps

Demographic variables: Age in years, Gender, Educational status, Occupation, Diet, Chronicity of renal failure, Duration of dialysis treatment, Use of Calcium tablet and Co morbid illness.

Description of Tool:

The tool was prepared by the investigator after an extensive study of the related literature and with the guidance of experts. The tool consists of,

Section A: Demographic Data

Structured interview schedule was used to collect demographic data. This section consists of demographic variables such as Age in years, Gender, Educational status, Occupation, Diet, chronicity of renal failure, Duration of dialysis treatment, Use of Calcium tablet and Co morbid illness.

Section B: Modified Penn spasm frequency Scale

Modified Penn spasm frequency Scale was used to assess muscle cramps and scoring was done according to the level of muscle cramps.

Table 3.1: Scoring procedure for the level of muscle cramps

S.No	Level of Muscle cramps	Score
1	Nil	0
2	Mild cramps	1-4
3	Moderate cramps	5-8
4	Severe cramps	9-12

Validity and Reliability :

Validity:

Validity of the tool was established by the consultation with guides and experts. The tool was validated by four experts in the field of nursing and one from the field of medicine. The tool was found adequate and suggestions given by the experts were incorporated.

Reliability :

The reliability of the Modified Penn spasm frequency Scale was checked and established by using inter rater method and the reliability value was r = 0.8 which showed that the tool was reliable and considered for proceeding.

Pilot study:

Pilot study was conducted from 12.12.16 to 17.12.16. Formal permission was obtained from the managing director of Sri Gokulam Hospital and Sri Gokulam Specialty Hospital. The pilot study was conducted with a sample size of 6 patients undergoing Haemodialysis with muscle cramps. In this 3 patients from Sri Gokulam Hospital were selected for experimental group and 3 patients from Sri Gokulam Specialty Hospital were selected for control group. On first sitting pre test was done by using Modified Penn Spasm Frequency Scale to assess the muscle cramps in both experimental and control group .At the end of dialysis on the same day Intradialytic stretching exercise was taught to the experimental group. On second sitting of haemodialysis investigator performed the Intradialytic stretching exercise to the experimental group at the third hour for about 20 minutes and post test was done to the experimental group at the end of haemodialysis by using Modified Penn spasm frequency scale. The control group not received Intradialytic stretching exercise and post test was done on third sitting by using the same scale. The data collected were

analyzed by using descriptive and inferential statistics. The pilot study shows that the tool was feasible and practicable for conducting the research**.**

Method of Data Collection:

Ethical consideration:

Prior to data collection written permission was obtained from the managing directors of Salem Gopi Hospital and VIMS Hospital, Salem. A written informed consent was obtained from the patients to participate in the study.

Data collection procedure:

The data was collected from 6.3.17 to 1.4.17. The patients who fulfilled the inclusion criteria were selected from the hospital by non-probability purposive sampling technique. Out of 60 patients, 30 patients from Salem Gopi Hospital were selected for experimental group and 30 patients from VIMS Hospital were selected for control group. Their demographic variables was collected by structured interview schedule. On first sitting pre test was done by using Modified Penn Spasm Frequency Scale to assess the muscle cramps in both experimental and control group. At the end of dialysis on the same day investigator taught Intradialytic stretching exercise to the experimental group. On second and third sitting of haemodialysis investigator performed the Intradialytic stretching exercise to the experimental group at the third hour for about 20 minutes. On Third sitting post test was done at the end of haemodialysis to the experimental group by using Modified penn spasm frequency scale. Patients in the control group did not receive any intervention other then routine care. The post test was done on third sitting by using the same scale.

Plan for Data analysis:

Data was analyzed using descriptive and inferential statistics. Descriptive statistics was used to assess the level of muscle cramps and inferential statistics was

used to evaluate the effectiveness of Intradialytic stretching exercise on muscle cramps. Chi square test was done to find out the association between the level of muscle cramps and their selected demographic variables.

Summary:

This chapter deals with research approach, research design, population, description of the setting, sampling, variables and description of the tool, method of data collection and plan for data analysis.

CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretation of collected data to evaluate the effectiveness of Intradialytic stretching exercise on muscle cramps among patients undergoing Haemodialysis. The collected data was tabulated, organized and analyzed by using inferential and descriptive statistics.

Section - A:

Distribution of patients according to their demographic variables.

Section - B:

a) Distribution of patients according to their pre test score on Muscle cramps among patients undergoing Haemodialysis in experimental and control group.
b) Distribution of patients according to their post test score on Muscle cramps among patients undergoing Haemodialysis in experimental and control group.

Section - C:

a) Comparison of pre test and post test score on Muscle cramps among patients undergoing Haemodialysis in experimental and control group.
b) Comparison of mean, standard deviation, mean percentage and mean difference on muscle cramps among patients undergoing Haemodialysis in experimental and control group.

Section - D: Hypotheses testing

a) Effectiveness of Intradialytic Stretching exercise on pre test and post test scores on muscle cramps among patients undergoing Haemodialysis in experimental group.

b) Effectiveness of Intradialytic Stretching exercise on post test scores on muscle cramps among patients undergoing Haemodialysis in experimental and control group.

c) Association of pre test score on Muscle cramps among patients undergoing Haemodialysis with their selected demographic variables in experimental and control group.

Section –A

Distribution of patients according to their demographic variables

Table- 4.1

Frequency and percentage distribution of patients according to their personal variables in experimental and control group. (n=60)

S.No.	Personal Variables	Experimental Group n=30		Control Group n=30	
		f	%	f	%
1.	**Age in years**				
	a) 21-30	-	-	-	-
	b) 31-40	6	20	7	23.33
	c) 41-50	10	33.34	8	26.67
	d) 51-60	8	26.66	9	30
	e) 61-70	6	20	6	20
2.	**Sex**				
	a) Male	18	60	20	66.66
	b) Female	12	40	10	33.34
3.	**Educational Status**				
	a) No formal education	11	36.66	11	36.66
	b) Primary education	2	6.68	3	10
	c) Secondary education	6	20	4	13.34
	d) Higher secondary education	5	16.66	9	30
	e) Degree	6	20	3	10
4.	**Occupation**				
	a) Home maker	7	23.35	9	30
	b) Government employee	5	16.66	2	6.68
	c) Private employee	4	13.33	8	26.66
	d) Self employee	6	20	8	26.66
	e) Retired	-	-	-	-
	f) Farmer	8	26.66	3	10

Table 4.1 shows the distribution of patients according to their personal variables in experimental and control group. Both in experimental and control group none of them are between the age group of 21 - 30 years. In experimental group 6(20%) patients and in control group 7(23.34%) patients are between the age group of 31-40 years. In experimental group 10(33.34%) patients and in control group 8(26.66%) patients are between the age group of 41-50years. In experimental group 8(26.66%) patients and in control group 9(30%) patients are between the age group of 51-60years Both in experimental and control group 6(20%) patients are between the age group of 61-70 years. In experimental group 18(60%) patients and in control group 20 (66.66%) patients are males. In experimental group 12 (40%) patients and in control group 10 (33.34%) patients are females.

Both in experimental and control group 11(36.66%) patients did not have formal education. In experimental group 2(6.68%) patients and in control group 3 (10%) patients have completed primary education. In experimental group 6(20%) patients and in control group 4(13.34%) patients have completed secondary education. In experimental group 5(16.66%) patients and in control group 9(30%) patients have completed higher secondary education. In experimental group 6(20%) patients and in control group 3(10%) patients have completed degree.

In experimental group 7(23.35%) patients and in control group 9(30%) patients are home maker. In experimental group 5(16.66%) patients and in control group 2 (6.68%) patients are government employee. In experimental group 4(13.33%) patients and in control group 8(26.66%) patients are private employee. In experimental group 6(20%) patients and in control group 8(26.66%) patients are self employee. In experimental group 8(26.66%) patients and in control group 3(10%) patients are farmers.

Table-4.2:

Frequency and percentage distribution of patients according to their Health related variables in experimental and control group.

(n=60)

S.No.	Health related Variables	Experimental Group n=30		Control Group n=30	
		f	%	f	%
1	**Diet**				
	a) Vegetarian	11	36.66	10	33.34
	b) Non-Vegetarian	19	63.34	20	66.66
2	**Chronicity of renal failure**				
	a) Below 1 year	-	-	-	-
	b) 1-4 years	27	90	20	66.66
	c) 5-8 years	3	10	10	33.34
	d) 9 years & above	-	-	-	-
3	**Duration of dialysis treatment**				
	a) 1 year	-	-	1	3.32
	b) 2 years	6	20	10	33.34
	c) 3 years	14	46.66	9	30
	d) 4 years & above	10	33.34	10	33.34
4	**Use of calcium tablets**				
	a) Yes	24	80	22	73.34
	b) No	6	20	8	26.66
5	**Presence of co-morbid illness**				
	a) Yes	14	46.66	14	46.66
	b) No	16	53.34	16	53.34

Table 4.2 shows the distribution of patients according to their health related variables. In experimental group 11(36.66%) patients and in control group 10

(33.34%) patients are vegetarian. In experimental group 19(63.34 %) patients and control group 20 (66.66%) patients are non vegetarian.

Both in experimental and control group none of the patients have chronicity of renal failure below 1 year. In experimental group 27(90%) patients and in control group 20(66.66%) patients have chronicity of renal failure between 1 to 4 years. In experimental group 3(10%) patients and in control group 10(33.34%) have chronicity of renal failure between 5 to 8 years. Both in experimental and control group none of them have chronicity of renal failure 9 years and above.

In experimental group none of the patients and in control group 1 (3.32%) patient has duration of dialysis treatment over 1 year. In experimental group 6(20%) patients and in control group 10(33.34%) patients have duration of dialysis treatment over 2 years. In experimental group 14(46.66%) patients and in control group 9(30%) patients have duration of dialysis treatment over 3 years. In experimental group 10(33.34%) patients and in control group 10(33.34%) patients have duration of dialysis treatment over 4 years and above.

In experimental group 24(80%) patients and in control group 22 (73.34%) patients taking calcium tablets. In experimental group 6(20%) patients and in control group 8 (26.66%) patients are not taking calcium tablets.

Both in experimental group and control group 14(46.66%) patients have presence of co-morbid illness. Both in experimental group and control group 16(53.33%) patients do not have co-morbid illness.

Section –B

a) Distribution of patients according to their pre test score on Muscle cramps among patients undergoing Haemodialysis in Experimental group.

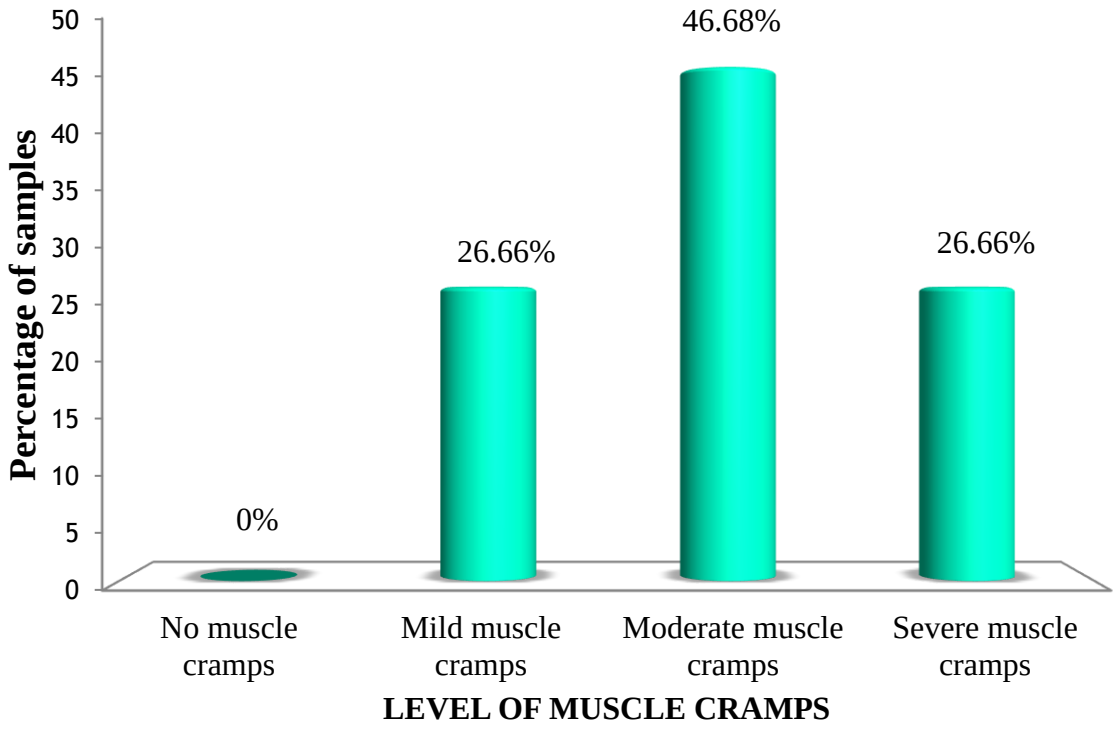

Fig 4.1: Percentage distribution of patients according to their pre test score on muscle cramps among patients undergoing Haemodialysis in experimental group.

The above bar diagram shows that in experimental group none of the patients have no muscle cramps, 8(26.66%) patients have mild muscle cramps, 14 (46.68%) patients have moderate muscle cramps and 8(26.66%) patients have severe muscle cramps.

b) Distribution of patients according to their pre test score on Muscle cramps among patients undergoing Haemodialysis in control group.

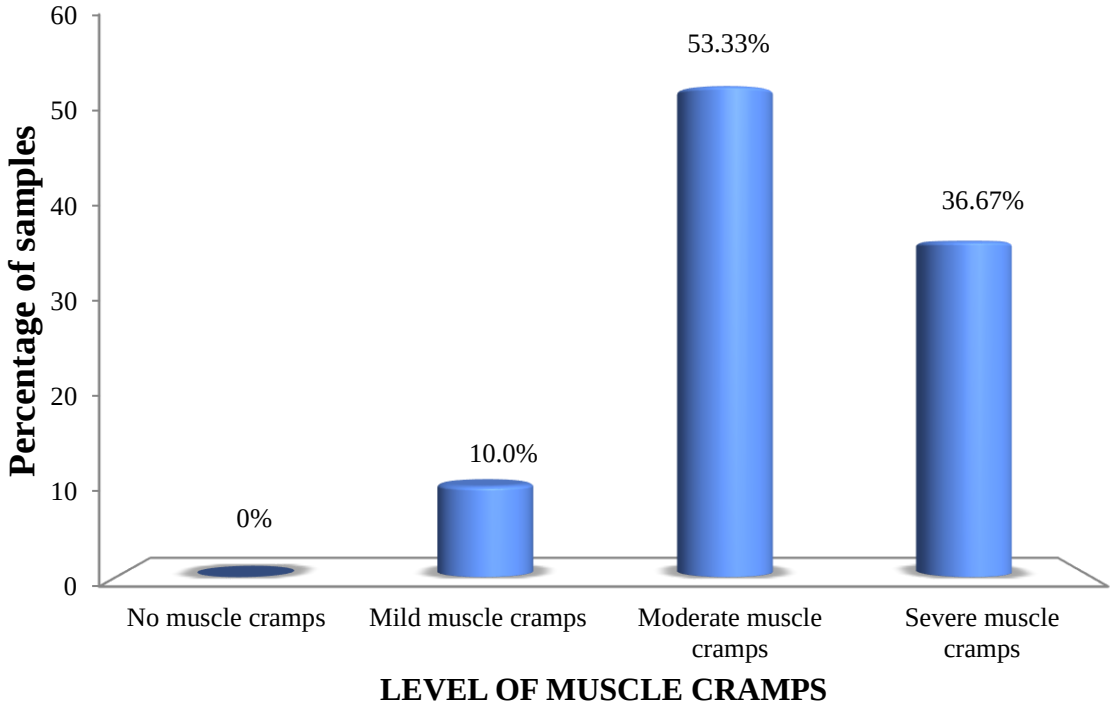

Fig 4.2: Percentage distribution of patients according to their pre test score on muscle cramps among patients undergoing Haemodialysis in control group.

The above bar diagram shows that in control group none of the patients have no muscle cramps, 3(10%) patients have mild muscle cramps, 16(53.33%) patients have moderate muscle cramps and 11 (36.67%) patients have severe muscle cramps.

c) Distribution of patients according to their post test score on Muscle cramps among patients undergoing Haemodialysis in Experimental group.

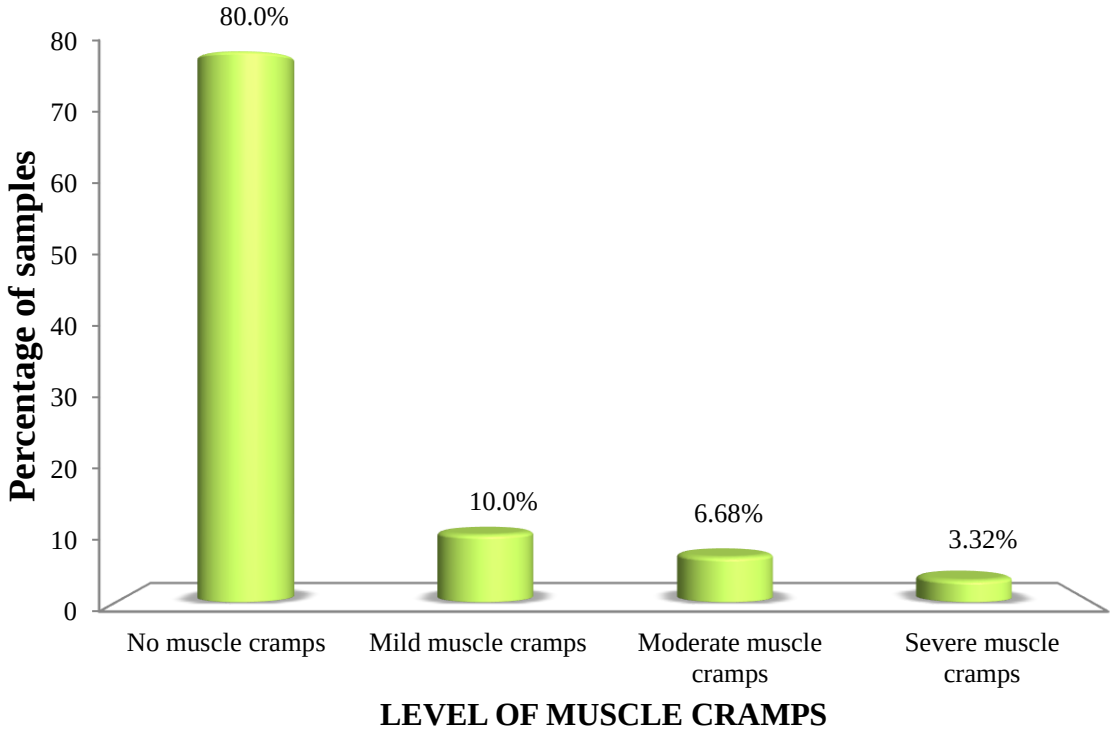

Fig 4.3: Percentage distribution of patients according to their post test score on muscle cramps among patients undergoing Haemodialysis in Experimental group.

The above bar diagram shows that in experimental group 24 (80%) patients have no muscle cramps, 3(10%) patients have mild muscle cramps, 2(6.68%) patients have moderate muscle cramps and 1 (3.32%) patient has severe muscle cramps.

d) Distribution of patients according to their post test score on Muscle cramps among patients undergoing Haemodialysis in Control group.

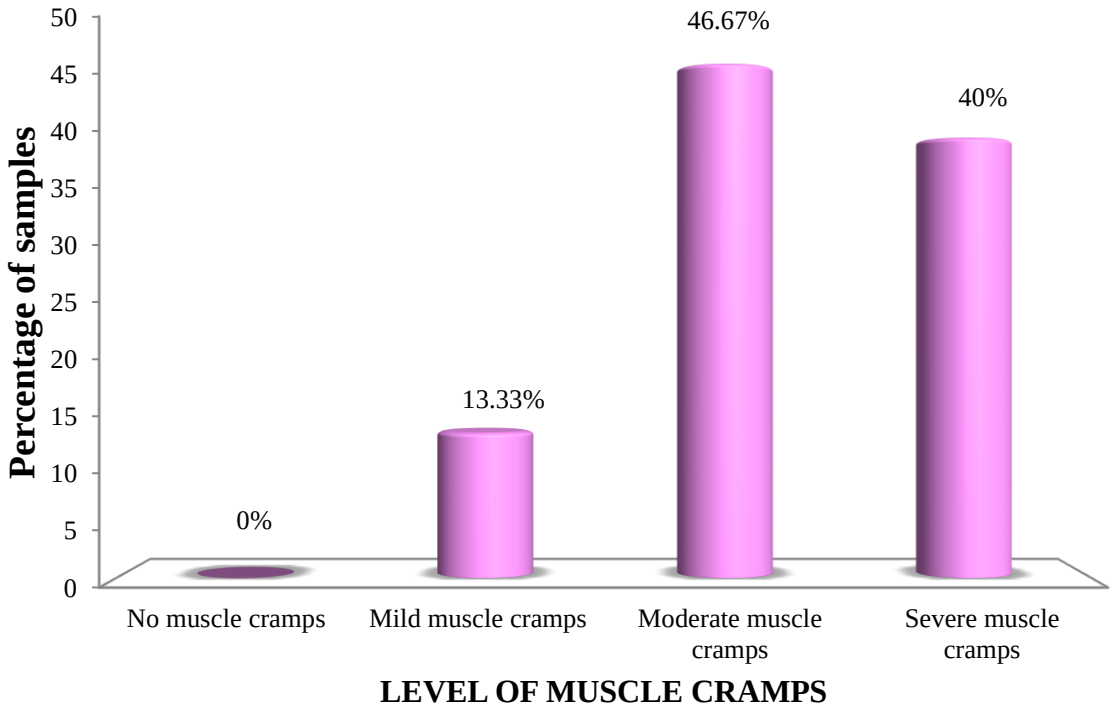

Fig 4.4: Percentage distribution of patients according to their post test score on muscle cramps among patients undergoing Haemodialysis in control group.

The above bar diagram shows that in control group none of the patients have no muscle cramps, 4(13.33%) patients have mild muscle cramps, 14(46.67%) patients have moderate muscle cramps and 12 (40%) patients have severe muscle cramps.

Section-C

a)Comparison of pre test and post test scores on muscle cramps among patients undergoing haemodialysis in experimental and control group.

Table 4.3:

Frequency and percentage distribution of patients according to pretest and posttest scores on muscle cramps among patients undergoing haemodialysis in experimental and control group.

(n=60)

S.No	Level of Muscle Cramps	Experimental group n=30				Control group n=30			
		Pre test		Post test		Pre test		Post test	
		f	%	f	%	f	%	f	%
1.	No Muscle Cramps	-	-	24	80	-	-	-	-
2.	Mild Muscle Cramps	8	26.66	3	10	3	10	4	13.33
3.	Moderate Muscle cramps	14	46.68	2	6.68	16	53.33	14	46.67
4.	Severe Muscle Cramps	8	26.66	1	3.32	11	36.67	12	40

The above table shows that in experimental group none of the patients have no muscle Cramps in pretest whereas in post test 24(80%) patients have no muscle cramps. In pre test 8(26.66%) patients have mild muscle cramps whereas in post test 3(10%) patients have mild muscle cramps. In pre test 14(46.68%) patients have moderate muscle cramps whereas in post test 2(6.68%) patients have moderate muscle

cramps. In pre test 8 (26.66%) patients have severe muscle cramps whereas in post test 1(3.32%) patient have severe muscle cramps. There is reduction of muscle cramps in the experimental group.

In control group none of the patients have no muscle cramps in pre test and post test. In pre test 3 (10%) patients have mild muscle cramps whereas in Post test 4 (13.33%) patients have mild muscle cramps. In pre test 16(53.4%) patients have moderate muscle cramps whereas in post test 14 (46.67%) patients have moderate muscle cramps. In pre test 11 (36.67%) patients have severe muscle cramps whereas in post test 12(40%) patients have severe muscle cramps. There is no reduction of muscle cramps in the control group.

b) Comparison of mean, standard deviation, mean percentage and mean difference on pre test and post test scores on muscle cramps among patients undergoing haemodialysis in experimental and control group.

Table 4.4:

Mean, standard deviation and mean difference on pretest and post test scores on muscle cramps among patients undergoing haemodialysis in experimental and control group.

(n=60)

Groups	Pre test			Post test			Difference in Mean %
	Mean	SD	Mean %	Mean	SD	Mean %	
Experimental Group	6.5	2.2	54	0.8	2	7	47
Control Group	7.2	2.2	60	7.4	2.1	61.9	1.9

The above table shows that in experimental group the pretest mean score is 6.5 ± 2.2 and mean percentage is 54 whereas in post test mean score is 0.8 ± 2 and mean percentage is 7. The mean difference is 47.

In control group the pretest mean score is 7.2 ± 2.2 and mean percentage is 60 whereas in post test mean score is 7.4 ± 2.1 and mean percentage is 61.9. The mean difference is 1.9. Experimental group patients have less level of muscle cramps when compared to the control group. Thus it becomes evident that Intradialytic stretching exercise reduces the severity of muscle cramps among patients undergoing haemodialysis in experimental group.

Section-D

Hypotheses testing

a) Effectiveness of Intradialytic stretching exercise on pre test and post test scores on muscle cramps among patients undergoing haemodialysis in experimental group.

Table 4.5:

Mean, standard deviation and 't' value on pre test and post test scores on muscle cramps among patients undergoing haemodialysis in experimental group.

(n=30)

Experimental Group	Mean	S.D	df	' t' value	Table value
Pre test	6.5	2.2	29	13.25*	2.045
Post test	0.8	2			

***significant at p ≤ 0.05 level**

The above table reveals that in experimental group the pretest mean score is 6.5 ±2.2 and the post test mean score is 0.8 ± 2. The calculated "t" value is 13.25 which is greater than the table value. Hence the research hypothesis H_1 is retained at p ≤ 0.05 level. Thus it is significantly evident that Intradialytic stretching exercise is effective in reducing muscle cramps among patients undergoing haemodialysis.

b) Effectiveness of Intradialytic stretching exercise on post test scores on muscle cramps among patients undergoing haemodialysis in experimental and control group.

Table 4.6:

Mean, standard deviation and 't' value on post test scores on muscle cramps among patients undergoing haemodialysis in experimental and control group.

(n=60)

Group	Mean	S.D	df	' t' value	Table value
Experimental group	0.8	2	58	16.5*	2.01
Control group	7.4	2.1			

***significant at p ≤ 0.05 level**

The above table reveals in experimental group post test mean score is 0.8 ± 2 and in control group post test mean score is 7.4 ± 2.1. The calculated "t" value is 16.5 which is greater than the table value. Hence the research hypothesis H_2 is retained at p ≤ 0.05 level. Thus it is significantly evident that Intradialytic stretching exercise is effective in reducing muscle cramps among patients undergoing haemodialysis.

c) Association of pre test score on muscle cramps among patients undergoing Haemodialysis with their selected demographic variables in experimental and control group.

Table- : 4.7:

Chi square test on pre test score on Muscle cramps among patients undergoing Haemodialysis with their selected demographic variables in experimental and control group.

(n = 60)

S.No.	Demographic variables	Experimental group n =30			Control group n =30		
		df	χ^2	Table value	df	χ^2	Table value
1	Age in years	6	5.3	12.59	6	6.03	12.59
2	Sex	2	3.21	5.99	2	1.71	5.99
3	Educational Status	8	5.4	15.51	8	12.6	15.51
4	Occupation	8	13.4	15.51	8	6.02	15.51
5	Diet	2	1.08	5.99	2	0.07	5.99
6	Chronicity of Renal Failure	2	1.23	5.99	2	1.23	5.99
7	Duration of Haemodialysis	4	2.51	9.49	6	3.87	12.59
8	Use of Calcium Tablets	2	0.42	5.99	2	1.27	5.99
9	Presence of co morbid illness	2	0.36	5.99	2	0.3	5.99

***Significant at $p \leq 0.05$ level**

The table 4.7 reveals in both in experimental and control group there is no significant association found between the muscle cramps and selected demographic

variables such as age in years, sex, education ,occupation, diet, chronicity of renal failure, duration of Haemodialysis, use of calcium tablets and presence of co morbid illness. Hence research hypothesis H_3 is rejected for these demographic variables at $p \leq 0.05$ level.

Summary:

This chapter deals with data analysis and interpretation in the form of statistical value based on the objectives. Distribution of patients according to the frequency and percentage distribution on muscle cramps among patients undergoing haemodialysis with their selected demographic variables in experimental and control group. The paired and unpaired 't' test is used to evaluate the effectiveness of Intradialytic stretching exercise on Muscle cramps among patients undergoing Haemodialysis. The chi- square test is used to find out the association between the Muscle cramps among patients undergoing Haemodialysis with their selected demographic variables such as age in years, sex, education, occupation, diet, chronicity of renal failure, duration of Haemodialysis, use of calcium tablets and presence of co morbid illness.

CHAPTER V

DISCUSSION

This study was conducted to evaluate the effectiveness of intradialytic stretching exercise on muscle cramps among patients undergoing haemodialysis at selected hospitals,Salem.

Frequency and percentage distribution of patients in experimental and control group according to their demographic variables.

The distribution of patients according to their demographic variables reveals that Majority of patients 10(33.34%) were between the age group of 41 to 50 years in experimental group and 9(30%) patients were between the age group of 51 to 60 years in control group. In experimental group more than half of patients 18 (60%) patients and in control group 20 (66.66%) patients were males.

The Present study was supported by **Deodatta Chafekar et,al. (2017)** who conducted a study to assess the clinical profile of End stage Renal Disease in patients undergoing Haemodialysis in Vasantrao Pawar Medical College at Nasik, India. The result revealed that most patients were male in the age group of 51-60 years.

Both in experimental and control group majority of patients 11(36.66%) had no formal education. In experimental group 8 (26.66%) patients were farmers where as in control group majority of the patients 9 (30%) were home maker. Majority of patients in experimental group 19(63.34%) and most in control group 20(66.66%) were non vegetarians. In experimental group most of the patients 27(90%) and in control group 20(66.66%) had chronicity of renal failure above 1 to 4 years. In experimental group nearby half of the patients 14 (46.67%) patients were undergoing haemodialysis over 3 years whereas in control group 10 (33.34%) patients were undergoing haemodialysis over 2 years and 4 years above. Most of the patients in

experimental group 24(80%) and in control group 22(73.34%) patients were taking calcium tablets. Half of the patients in experimental and control group 16 (53.34%) patients had no co morbid illness.

Assessment of the Muscle cramps among patients undergoing haemodialysis in experimental and control group.

In experimental group pretest none of the patients had no muscle cramps, 8(26.66%) patients had mild muscle cramps, 14 (46.68%) patients had moderate muscle cramps and 8(26.66%) patients had severe muscle cramps. In control group pre test none of the patients had no muscle cramps, 3(10%) patients had mild muscle cramps, 16 (53.33%) patients had moderate muscle cramps and 11 (36.66%) patients had severe muscle cramps.

The Present study was supported by **Shylac Issac, et. al(2016)** who conducted a study on the effect of intradialytic stretching exercises on muscle cramps among patient undergoing haemodialysis. The result showed that the pre test level of muscle cramps among 7(23%), 13(43.3%) and 17(56.6%) respectively were moderate and 23(77%) 17(56.6%) and 13(43.3%) respectively were severe in Day 1,2 and 3 whereas majority of 20(66.6%) had moderate level of muscle cramps and minority of 1(3.33%) had no pain during the 4^{th} day. In day 5, maximum 19(63.3%) had severe muscle cramps and 2(6.66%) had no pain and none of them had mild pain. The results showed in the interventional group 6(20%), 10(33.3%),10(33.3%) 7(23.3%),11(3.3%) respectively during day 1,2,3,4 and 5 had moderate muscle cramps and 24(80%) ,20(66.6%),16(53.3%),20(66.6%),17(56.6%) respectively had mild muscle cramps during 1^{st} and 5^{th} days of haemodialysis. During days 3,4 and 5 about 4(13.3%),3(10%) and 2(6.66%) respectively had no pain and none of them had severe pain during all days.

Effectiveness of Intradialytic stretching exercise on muscle cramps among patients undergoing haemodialysis in experimental and control group.

In experimental group the pretest mean score was 6.5 ±2.2 and the post test mean score was 0.8 ± 2. The calculated 't' value 13.25 which was greater than the table value. Hence the research hypothesis H_1 was retained at $p \leq 0.05$ level. Thus it was significantly evident that Intradialytic stretching exercise is effective in reducing muscle cramps among patients undergoing haemodialysis.

The present study was supported by **Salem,s., Mohamed,s.(2017)** Who conducted a study on the effect of Intradialytic stretching exercises on leg cramps among patient undergoing haemodialysis. The study findings reveals that there was significant difference between the study participants leg cramp intensity and frequency before and after application of stretching exercises with t=8.27 at p value=0.000 and t=5.22 at p value =0.000 respectively. The study concluded that Intradialytic stretching exercise was effective to reduce the leg cramps.

In experimental group the post test mean score was 0.8±2 and in control group the post test mean score was 7.4 ± 2.1. The calculated 't' value 16.5 which was greater than table value. Hence the research hypothesis H_2 was retained at $p \leq 0.05$ level. Thus it was significantly evident that Intradialytic stretching exercise was effective in reducing the severity of among patients undergoing haemodialysis with muscle cramps.

The present study was supported by **Basemath S.S Moris, (2014)** who conducted a study on the effect of Intradialytic stretching exercise on muscle cramps among patient undergoing haemodialysis at Chennai. The result of the study reveals that in the pre-test 53.3% had severe muscle cramps, 46.7% had moderate muscle cramps and after performing the intradialytic stretching exercise it was found that

40% had no muscle cramps, 24.4% had mild muscle cramps and 35.6 % had moderate muscle cramps with 't' value 21.975 at $P < 0.001$ level of significance. The study concluded that Intradialytic stretching exercise was effective to reduce the severity of muscle cramps during dialysis.

Association of pre test score on Muscle Cramps among patients undergoing Haemodialysis with their selected demographic variables in experimental and control group.

Both in experimental and control group there was no association between muscle cramps and their selected demographic variables. Hence research hypothesis H_3 is rejected for these demographic variables at $p \leq 0.05$ level.

The present study was supported by **Lekha.J., Abraham,E., Malarvizhi.G. (2017)** who conducted a study on the effectiveness of Intradialytic stretching exercise on prevention and reduction of muscle cramps among patients undergoing haemodialysis in Coimbatore. The study concluded that stretching exercise during the haemodialysis prevent the occurrence of muscle cramps and improves the quality of life among patients undergoing haemodialysis. There was no association found between the level of muscle cramps and demographic variables.

Summary:

This chapter dealt with discussion of the study with reference to the objective and supportive study.

CHAPTER VI

SUMMARY, CONCUSION, IMPLICATIONS AND RECOMMENDATIONS

This chapter consists of four sections. In first two sections, the summary and conclusion are presented. In the last two sessions, the recommendations for further research and implications for nursing practice are presented.

Summary:

The main focus of the study was to evaluate the effectiveness of intradialytic stretching exercise on muscle cramps among patients undergoing haemodilaysis. Quasi experimental study was used for this study. The conceptual frame work for the study was based on Imogene King's Goal Attainment Model. The tool used in this study consisted of two sections. Section A was Demographic variables, Section B was Modified Penn Spasm Frequency Scale to assess the Muscle cramps. Non probability purposive sampling technique was adopted for the study and sample size was 60. Among this 30 patients were selected for experimental group in Salem Gopi Hospital them 30 patients were selected for control group in VIMS Hospital, Salem. The patients were selected between the age group of 21 to 70 years, patients who are undergoing haemodialysis with muscle cramps.

The collected data were analyzed by using both descriptive and inferential statistics. To test the hypothesis paired and unpaired 't' test and chi square test were used. The hypotheses were checked at $p \leq 0.05$ level of significance.

The Major Findings of the Study:

- Majority of patients 10(33.34%) were between the age group of 41 to 50 years in experimental group and 9(30%) patients were between the age group of 51 to 60 years in control group.
- In experimental group half of patients 18 (60%) patients and in control group 20 (66.66%) patients were males.
- Both in experimental and control group majority of patients 11(36.66%) had no formal education.
- In experimental group 8 (26.66%) patients were farmers where as in control group majority of the patients 9 (30%) were home maker.
- Majority of patients in experimental group 19(63.34%) and in control group 20(66.66%) were non vegetarians.
- In experimental group most of the patients 27(90%) patients and in control group 20(66.66%) had chronicity of renal failure above 1 year to 4 years.
- In experimental group half of the patients 14 (46.7%) patients were undergoing haemodialysis over 3 years whereas in control group 10 (33.34%) patients were undergoing haemodialysis over 2 years and 4 years above.
- Most of the patients in experimental group 24(80%) and in control group 22(73.34%) patients were taking calcium tablets.
- Majority of the patients in experimental and control group 16 (53.34%) patients had no comorbid illness.
- In experimental group pre test 14(46.68%) patients had moderate muscle cramps and in control group pre test 16(53.33%) patients had moderate muscle cramps where as in experimental group post test 24 (80%) patients had no muscle cramps and in control group post test 14(46.67%) patients had

moderate muscle cramps.

- In experimental group the pre test mean score was 6.5±2.2 and the post test mean score was 0.8±2. The pre test mean percentage was 54 and post test mean percentage was 7. The mean difference was 47. In control group the pre test mean score was 7.2 ± 2.2 and the post test mean score was 7.4±2.1. The pre test mean percentage was 60 and post test mean percentage was 61.9. The mean difference was 1.9. Experimental group patients had reduced severity of muscle cramps when compared to control group. Thus it became evident that Intradialytic stretching exercise reduced the severity of muscle cramps among patients haemodialysis.
- In experimental group the pre test mean score was 6.5 ± 2.2 and the post test mean score was 0.8 ± 2 . The calculated‘t’ value 13.25 which was greater than the table value. Hence the research hypothesis H_1 was retained at $p \leq 0.05$ level. Thus it was significantly evident that intradialytic stretching exercise was effective in reducing the severity of muscle cramps among patient undergoing haemodialysis.
- In experimental group the post test mean score was 0.8 ± 2 and in control group the post test mean score was 7.4±2.1. The calculated ‘t’ value 16.5 which was greater than table value. Hence the research hypothesis H_2 was retained at $p \leq 0.05$ level. Thus it was significantly evident that Intradialytic stretching exercise was effective in reducing the severity of among patients undergoing haemodialysis with muscle cramps.
- Both in experimental and control group there was no association found between muscle cramps and their selected demographic variables. Hence the hypothesis H_3 was rejected.

Conclusion:

The present study was done to evaluate the effectiveness of Intradialytic stretching exercise on muscle cramps among patients undergoing haemodialysis at selected hospitals, Salem. The findings of the study revealed that Intradialytic stretching exercise was effective on significant reduction of muscle cramps among patients undergoing haemodialysis. There was no significant association between the muscle cramps and their selected demographic variables in experimental and control group.

Implications:

Nursing Practice:

- Intradialytic stretching exercise can be practiced in nursing care.
- Nurses can identify the importance of Intradialytic stretching exercise and it can be used as an adjuvant to pharmacological therapy in reducing muscle cramps.
- Nurses can demonstrate or teach the Intradialytic stretching exercise and encourage the patients to practice it, those who are suffering from muscle cramps during haemodialysis.
- Nurses can teach Intradialytic stretching exercise to improve the functional performance of the patients undergoing haemodialysis with muscle cramps.

Nursing Education:

- In service education program should be conducted for nurses and help them to gain knowledge regarding Intradialytic stretching exercises.
- Provide exposure to various non pharmacological measures and therapies and update the nursing curriculum.

- Nurse educator can encourage students to make new ideas in managing the muscle cramps for haemodialysis patients.
- Periodic continuing education programs can be arranged regarding non pharmacological measures and other therapies to update nursing profession about its importance in reducing muscle cramps among patients undergoing haemodialysis.

Nursing Research:

- Generalisation of the study result can be made by replication of the study.
- Disseminate the findings through conference, seminars, publication in journals and world wide web.
- Findings of the study can be utilized for conducting further observational studies.
- The findings of the study can help to improve the scientific body of professional knowledge upon which further research can be conducted.

Nursing Administration:

- The nurse administrator can organize and conduct various continuing education programs and in-service education programs on non pharmacological and other therapies for the management of muscle cramps during haemodialysis.
- The nurse administrator should take initiatives to make protocol of Intradialytic stretching exercises for patients undergoing haemodialysis with muscle cramps.

Recommendations:

- Comparative study can be conducted to evaluate the effectiveness of Intradialytic stretching exercise vs local massage on muscle cramps management.
- A true experimental study can be done to evaluate the effectiveness of Intradialytic stretching exercise on muscle cramps.
- A study can be done on the effect of various non pharmacological therapies on muscle cramps during haemodialysis.
- An experimental study can be done on the effect of Intradialytic stretching exercise on functional performance of patients undergoing haemodialysis with muscle cramps.

Summary:

This chapter dealt with summary, conclusion, major findings, implications of nursing practice and recommendations.

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ANNEXURE- A

LETTER SEEKING PERMISSION TO CONDUCT A RESEARCH STUDY

From

Sasirekha.C

Final Year, M.Sc (Nursing),

Sri Gokulam College of Nursing,

Salem, Tamil Nadu.

To

The Principal,

Sri Gokulam College of Nursing,

Salem, Tamil Nadu.

Respected Sir/Madam,

Sub: Permission to conduct research project- request –reg

I, **Sasirekha**, Final Year M.Sc.(Nursing) student of Sri Gokulam College of Nursing, is conducting research project which is to be submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai as partial fulfilment of University requirement for the award of M.Sc.(Nursing) Degree.

Topic: "A Study to assess the Effectiveness of Intradialytic stretching exercise on Muscle cramps among patients undergoing Haemodialysis at Selected Hospitals, Salem."

I wish to seek administrative permission to conduct the research study at Salem Gopi Hospital and VIMS Hospital, Salem. Kindly do the needful.

Thanking you.

Date:

Place:

Your's Sincerely

(SASIREKHA.C)

ANNEXURE-B

LETTER GRANTING PERMISSION TO CONDUCT A RESEARCH STUDY

ii

SRI GOKULAM COLLEGE OF NURSING
3/836, Periyakalam, Neikkarapatti, Salem - 636 010.
Phone : 0427 - 6544550,2272240,2272250 Fax : 0427 - 2270200, 2447077
Email : sgcon2001@yahoo.com, sgcon2001@gmail.com

Date : .....

LETTER SEEKING PERMISSION TO CONDUCT A RESEARCH STUDY

To

The Managing Director,

Sri Gopi Hospital,

Salem.

Respected Sir / Madam,

Sub: Permission to conduct research project request-reg.

This is to introduce **Mrs.C.Sasirekha**, Final Year M.Sc (Nursing) student of Sri Gokulam College of Nursing. She is to conduct a research project which is to be submitted to the Tamilnadu Dr.M.G.R.Medical University, Chennai in partial fulfilment for the award of M.Sc (Nursing) Degree.

Topic: "A Study to Evaluate the Effectiveness of Intradialytic Stretching Exercise on Muscle Cramps among Patients Undergoing Haemodialysis at Selected Hospitals, Salem".

I request you to kindly permit her to conduct a research project in your esteemed hospital. She will adhere to the Hospital policies and regulations.

Thanking you,

Yours sincerely,

(Dr.K.Tamizharasi)

Date:

Place: Salem

Dr. HARI JANAKIRAMAN
M.D.,DNB (NEPRO) DIP. DIA.,
Reg. No: 70651,
Salem Gopi Hospitals Pvt. Ltd.,
23-B, Ramakrishna Road,
SALEM - 636 007

SRI GOKULAM COLLEGE OF NURSING
3/836, Periyakalam, Neikkarapatti, Salem - 636 010.
Phone : 0427 - 6544550,2272240,2272250 Fax : 0427 - 2270200, 2447077
Email : sgcon2001@yahoo.com, sgcon2001@gmail.com

Date : .....

LETTER SEEKING PERMISSION TO CONDUCT A RESEARCH STUDY

To

The Chief Operating Officer,

VIMS Hospital,

Salem.

Respected Sir / Madam,

Sub: Permission to conduct research project request-reg.

This is to introduce **Mrs.C.Sasirekha**, Final Year M.Sc (Nursing) student of Sri Gokulam College of Nursing. She is to conduct a research project which is to be submitted to the Tamilnadu Dr.M.G.R. Medical University, Chennai in partial fulfilment for the award of M.Sc (Nursing) Degree.

Topic: "A Study to Evaluate the Effectiveness of Intradialytic Stretching Exercise on Muscle Cramps among Patients Undergoing Haemodialysis at Selected Hospitals, Salem".

I request you to kindly permit her to conduct a research project in your esteemed hospital. She will adhere to the Hospital policies and regulations.

Thanking you,

Yours sincerely,

(Dr.K.Tamizharasi)

Date:

Place: Salem.

Permitted for the study
19.12.16

ANNEXURE-C
LETTER SEEKING PERMISSION TO CONDUCT A RESEARCH STUDY

From

Mrs.sasirekha,

Final Year M.Sc., (N)

Sri Gokulam College of Nursing, Salem, Tamil Nadu.

To,

(Through proper channel) Respected Sir/ Madam,

Sub:Requesting opinion and suggestions of experts for establishing content validity of the tool.

I **Mrs.Sasirekha,** II Year M.Sc., (Nursing) student of Sri Gokulam College of Nursing, Salem, have selected the below mentioned Statement of the Problem for the research study to be submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai as partial fulfillment for the award of Master of science in Nursing.

Topic: "A Study to assess the Effectiveness of Intradialytic stretching exercise on Muscle cramps among patients undergoing Haemodialysis at Selected Hospitals, Salem."

I request you to kindly validate the tool developed for the study and give your expert opinion and suggestion for necessary modifications.

Thanking you,

Place : Salem Yours sincerely,

Date :

Mrs. Sasirekha

Enclosed:

1. Certificate of validation
2. Criteria checklist of evaluation of tool
3. Tool for collection of data
4. Intervention

ANNEXURE- D

TOOL

Section – A: Demographic Variables

Instructions: The researcher ask questions to the participants and mark (✓).

Sample No:

1) **Age in years**

a) 21-30 ( )

b) 31-40 ( )

c) 41-50 ( )

d) 51-60 ( )

e) 61-70 ( )

2) **Sex**

a) Male ( )

b) Female ( )

3) **Educational status**

a) No formal education ( )

b) Primary education ( )

c) Secondary education ( )

d) Higher secondary education ( )

e) Degree ( )

4) **Occupation**

a) Home maker ( )

b) Government Employee ( )

c) Private Employee ( )

d) Self-employee ( )

e) Retired ( )

f) Farmer ( )

5) **Diet**

a) Vegetarian ( )

b) Non vegetarian ( )

6) **Chronicity of renal failure**

a) Below 1 year ( )

b) 1-4 years ( )

c) 5-8 years ( )

d) 9 years and above ( )

7) **Duration of dialysis treatment**

a) 1 year ( )

b) 2 years ( )

c) 3 years ( )

d) 4 years and above ( )

8) **Use of calcium tablets**

a) Yes ( )

b) No ( )

9) **Presence of co morbid illness**

a) Yes ( )

b) No ( )

If yes,specify…… ( )

Section B: Modified Penn spasm Frequency scale

The Modified Penn spasm frequency scale is used to assess the muscle cramps

S.No	Characteristics	Total Score	Pre test Score	Post test score
1.	**Frequency of Muscle cramps**			
	Nil	0		
	1 Time	1		
	2- 3 Times	2		
	4-5 Times	3		
	More than 5 Time	4		
2.	**Duration of Muscle Cramps**			
	Nil	0		
	1 minute	1		
	2 minutes	2		
	3 minutes	3		
	4 minutes	4		
3.	**Level of Pain**			
	Nil	0		
	Mild pain	1		
	Moderate pain	2		
	Severe pain	3		
	Worst Possible pain	4		
	Total Score	**12**		

Scoring procedure for the level of muscle cramps

S.No	Level of Muscle cramps	Total Score	Pre test score	Post test score
1	Nil	0		
2	Mild cramps	1-4		
3	Moderate cramps	5-8		
4	Severe cramps	9-12		

INTERVENTION

Intradialytic Stretching Exercise:

Intradialytic stretching exercise is the form of physical exercise that prevents stiffness, relieves tendon shortening and relaxes the muscles to prevent cramps during the dialysis procedure.

Benefits of Intradialytic stretching exercise:

- Reduces stress and Muscular cramps
- Provides sense of peace and well being
- Lengthens muscles
- Improves tissue flexibility and elasticity
- Increased blood flow

Guidelines for doing stretch exercise:

- Duration : 20mins,
- Each exercise have to be perform by the patients (active and passive)

Instruction:

- Breath slowly and deeply during exercise
- Exhale slowly
- If joints or muscles hurt at any time stop the exercise

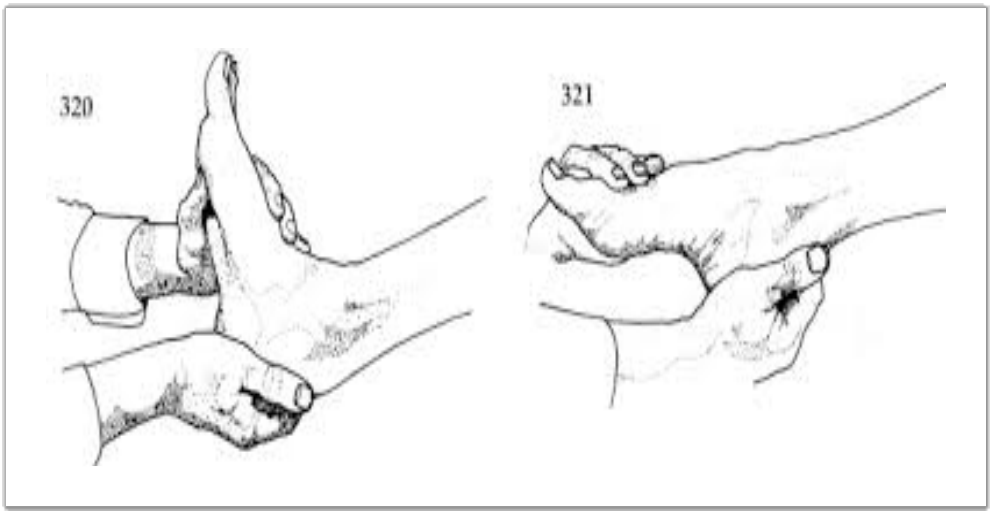
Passive Exercise

A. Knee Flexion & Extension

Procedure

1. Patient in supine position.
2. Investigator has to hold the patient leg with one hand supporting the knee and the other hand holding near the ankle.
3. Investigator has to bend & straight the knee for ten times.
4. Repeat the same exercise to other leg for 10 times.

B. Ankle Plantar Flexion & Dorsiflexion



Procedure

1. Patient in supine position.

2. Investigator has to hold the foot in one hand and stabilize the leg with another hand near the ankle.
3. Investigator has to move the patient foot forward and backward for ten times.
4. Repeat the same exercise to other leg for ten times.

C.Toes Movement

Procedure

1. Patient in supine position.
2. Investigator has to hold the foot in one hand and toes in another hand.
3. Investigator has to flex and extent the toes for ten times.
4. Repeat the same exercise to other leg toes for ten times.

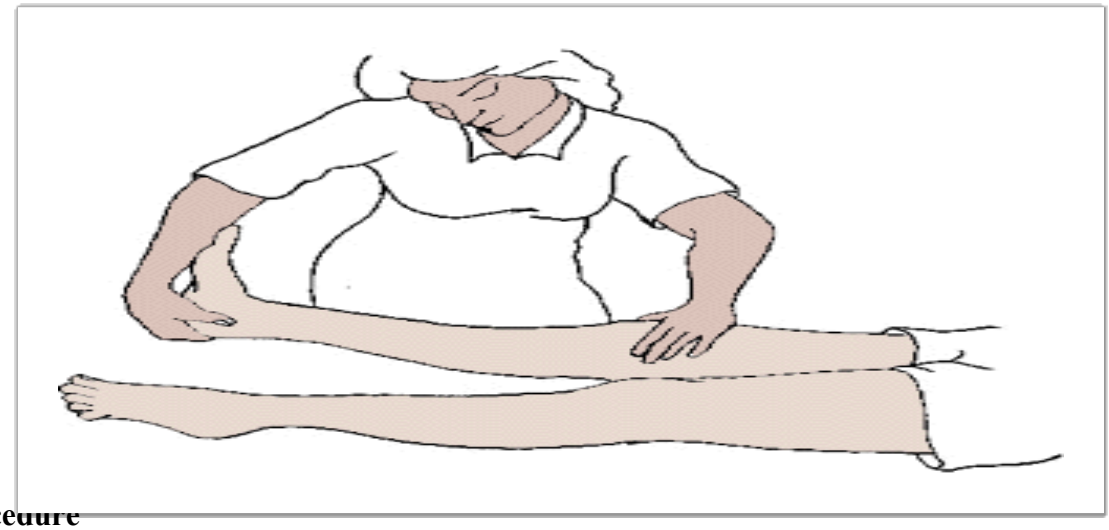
D. Foot Inversion & Eversion

Procedure

1. Patient in supine position.
2. Investigator has to hold the foot in one hand and hold the ankle with another hand.
3. Tilt the foot medially and laterally by the researcher for 20 times.
4. Repeat the same exercise for opposite leg.

Passive Stretching Exercise

A) Calf Stretch



Procedure

1. Patient in supine position.
2. Investigator has to Place one hand on the knee for support to prevent it from bending and with other hand hold the heel and forearm is placed against the ball of the foot.
3. Push the ball of the foot forward bending the knee, bending the foot toward the knee and stretching the muscles in the back of the leg.
4. Repeat it for 5 times and each stretching researcher has to hold for 30seconds.

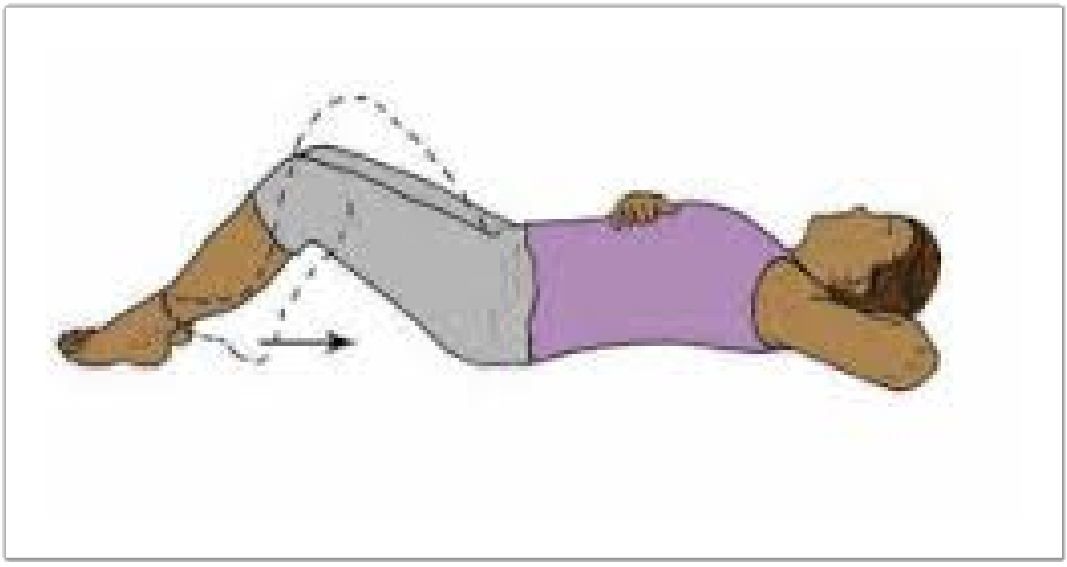
B) Hamstring Stretch

Procedure

1. Patient in supine lying position.
2. Investigator has to stand side of the bed.
3. Investigator has to lift the patient leg forward and keep the patient leg in researcher shoulder.
4. Place both the hands on the patients knee to prevent bending of the knee.
5. Investigator has to maintain the position and move (stretching) forward.
6. Repeat it for 5 times and each stretching researcher has to hold for 30seconds.

Active Exercise

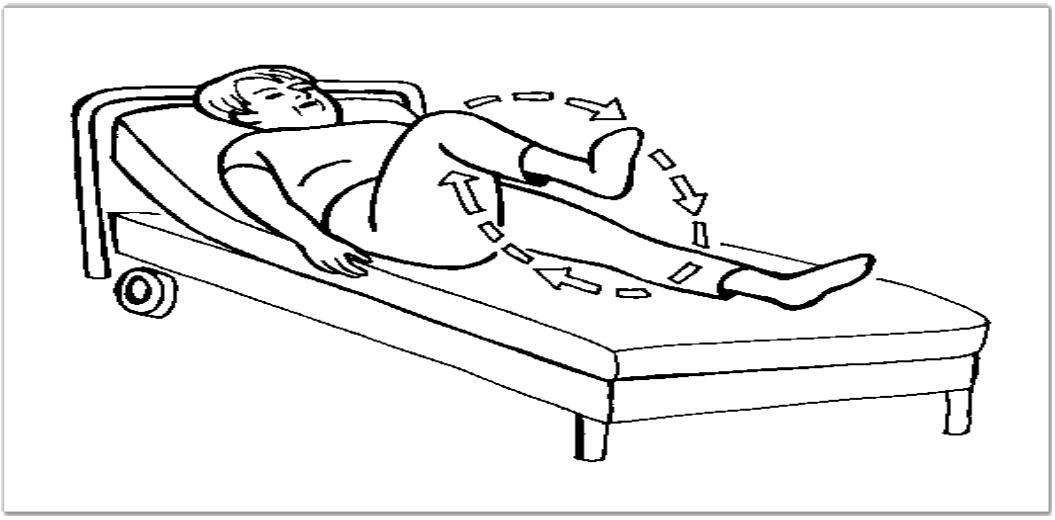
A) Knee flexion and extension:



Procedure

1. Patient in supine position.
2. Ask the patient to bend and straight the knee actively by drawing the heel towards the bed.
3. Repeat the steps for 20 times.

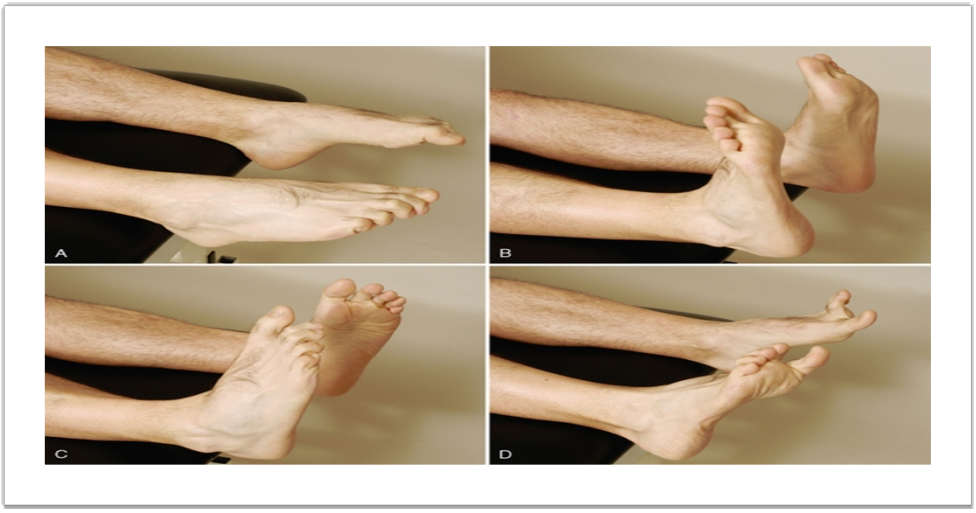
B.Seated Marching



Procedure

1. Patient in supine position.
2. Ask the patient to keep the lower back flat on the floor while breathing out, leg alternatively to perform the bike riding movements.
3. Alternatively use the right and left leg.
4. Patient has to flex both hip and knee to do the bike riding movement.
5. Repeat it for 10 times in each leg.

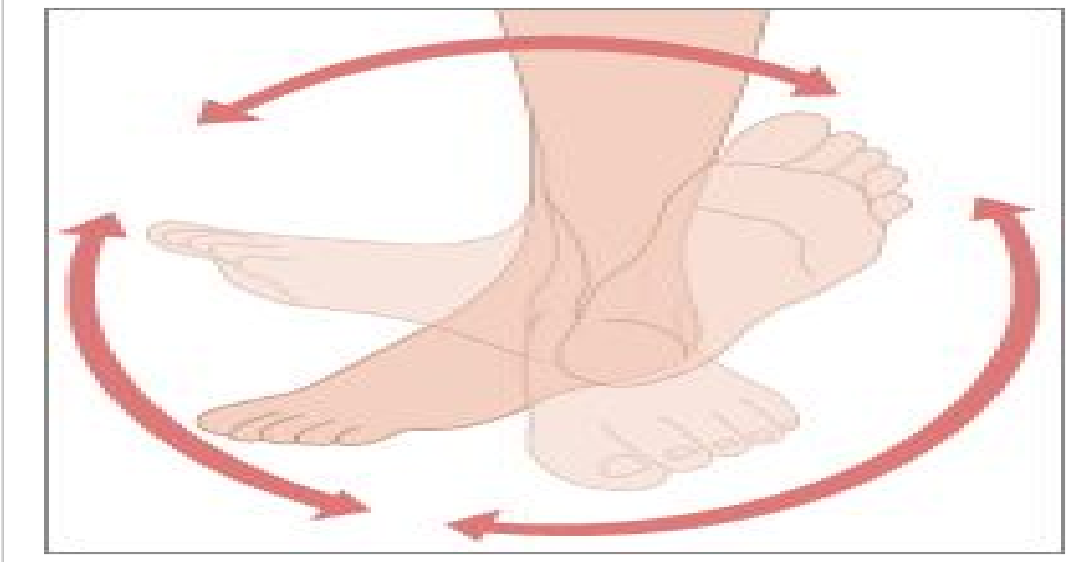
C. Ankle toe movement:



Procedure

1. Patient in supine position.
2. Investigator has to raise the patient leg up for about 15cm height stabilize the knee by one hand and hold above the ankle with other hand.
3. Ask the patient to actively plantar and dorsi flexion of foot and toe flexion and extension.
4. Repeat it for 10 times in each leg.

D. Foot Circle



Procedure

1. Patient in supine position.
2. Investigator has to raise the patient leg up for about 15cm height stabilize the knee by one hand and hold above the ankle with other hand.
3. Ask the patient to do clockwise and anticlockwise rotation of the foot.
4. Repeat it for 10 times in each leg.

ANNEXURE – E

CERTIFICATE OF VALIDATION

This is to certify that the tool developed by **Mrs.Sasirekha,** Final Year M.Sc Nursing student of Sri Gokulam College of Nursing, Salem (Affiliated to Tamil Nadu Dr.M.G.R. Medical University, Chennai) is validated and can proceed with this tool and content for the main study entitled **"A Study to assess the Effectiveness of Intradialytic stretching Exercise on Muscle cramps among**

Patients undergoing Haemodialysis at selected Hospitals, Salem".

Signature with Date

ANNEXURE – F

LIST OF EXPERTS

1. Dr. Karthikeyan, MD.,

Consultant Nephrologist,

Sri Gokulam Hospital,

Salem.

2. Mrs. Sheeja M.Sc.(N).,

Associate professor,

Shanmuga College of Nursing

Salem.

3. Mrs. Lakshmi Prabha, M.Sc (N).,

HOD of Medical Surgical Department,

Vinayaka Mission College of Nursing,

Salem.

4. Mrs. Sumathi.M M.Sc (N).,

Associate professor, Medical surgical department,

Vinayaka Mission College of Nursing,

Salem.

5. Mrs.Sumathi.B, M.Sc (N).,

Associate professor, Medical surgical department,

Vinayaka Mission College of Nursing,

Salem.

CERTIFICATE OF VALIDATION

This is to certify that the tool developed by **C.Sasirekha,** Final Year M.Sc Nursing student of Sri Gokulam College of Nursing,Salem (Affiliated to Tamil Nadu Dr.M.G.R. Medical University, Chennai) is validated and can proceed with this tool and content for the main study entitled **"A Study to assess the Effectiveness of Intradialytic Stretching Exercise on Muscle Cramps among Patients Undergoing Haemodialysis at Selected Hospitals, Salem".**

Signature with Date

Dr. V. Karthikeyan M.D.D.M (N)
Consultant Nephrologist,
Sri Gokulam Hospital, Salem-4.
Regd. No: 48486

CERTIFICATE OF VALIDATION

This is to certify that the tool developed by **C.Sasirekha,** Final Year M.Sc Nursing student of Sri Gokulam College of Nursing,Salem (Affiliated to Tamil Nadu Dr.M.G.R. Medical University, Chennai) is validated and can proceed with this tool and content for the main study entitled **"A Study to assess the Effectiveness of Intradialytic Stretching Exercise on Muscle Cramps among Patients Undergoing Haemodialysis at Selected Hospitals, Salem".**

16/12/16

Signature with Date

CERTIFICATE OF VALIDATION

This is to certify that the tool developed by **C.Sasirekha,** Final Year M.Sc Nursing student of Sri Gokulam College of Nursing,Salem (Affiliated to Tamil Nadu Dr.M.G.R. Medical University, Chennai) is validated and can proceed with this tool and content for the main study entitled **"A Study to assess the Effectiveness of Intradialytic Stretching Exercise on Muscle Cramps among Patients Undergoing Haemodialysis at Selected Hospitals, Salem".**

M. Sumathi
15/12/16

Signature with Date

CERTIFICATE OF VALIDATION

This is to certify that the tool developed by **C.Sasirekha,** Final Year M.Sc Nursing student of Sri Gokulam College of Nursing,Salem (Affiliated to Tamil Nadu Dr.M.G.R. Medical University, Chennai) is validated and can proceed with this tool and content for the main study entitled **"A Study to assess the Effectiveness of Intradialytic Stretching Exercise on Muscle Cramps among Patients Undergoing Haemodialysis at Selected Hospitals, Salem".**

B. Sumathy 12/12/16

Signature with Date

[B. SUMATHY]

Associate Professor

VMACON, Salem.

ANNEXURE –G

CERTIFICATE OF EDITION

TO WHOMEVER IT MAY CONCERN

Certified that the dissertation paper titled "**A study to assess the effectiveness of Intradialytic stretching exercise on muscle cramps among patients undergoing haemodialysis at selected hospitals, Salem". By Mrs. C. Sasirekha,** has been checked for accuracy and correctness of English language used in presenting the paper is lucid, unambiguous free of grammatical or spelling errors and apt for the purpose.

Date:

Signature

Name and Designation

N. TAMILCHELVI,
M.A., (Eng) M.ACHIS) M.Phil., B.Ed.,
P.G. Assistant (English)
Govt. Higher Secondary School
OMALUR (PO.) Salem (Dt.)

ANNEXURE – H

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ANNEXURE I

PHOTOS

The Investigator assessing the muscle cramps

The Investigator performing passive exercises

The Investigator performing passive stretching exercises